

Economic Bulletin for Latin America

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UNITED NATIONS

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EXPLANATION OF SYMBOLS

Three dots (...) indicate that data are not available or are not separately reported.

A dash (—) indicates that the amount is nil or negligible.

A minus sign (—300) indicates a deficit or a decrease.

A space is used to separate thousands and millions (3 123 425).

A stroke (/) indicates a crop year or a fiscal year, e.g., 1954/55.

An asterisk (*) is used to indicate partially or totally estimated figures.

"Tons" and "dollars" are metric tons and United States dollars, respectively, unless otherwise stated.

Minor discrepancies in totals and percentages are due to rounding.

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ECONOMIC BULLETIN FOR LATIN AMERICA

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STABILIZING THE TERMS OF TRADE OF UNDER-DEVELOPED COUNTRIES*

by *Nicholas Kaldor*

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1. THE PROBLEM OF THE TERMS OF TRADE

Ever since the mid-fifties the terms of trade of the under-developed areas of the world (i.e. all countries excluding those of North America, Western Europe, Australia, New Zealand, South Africa, Japan and the centrally-planned economies) have suffered a steady deterioration, the rate of which has shown some signs of acceleration during the last two years.¹ Taking 1955 as a base, the deterioration up to the middle of 1962 was over 11 per cent. This refers to the total exports and imports of the under-developed countries, including their exports of manufactures and their imports of primary products from other countries. The deterioration of the terms of exchange between primary products and manufactures has been considerably greater: since 1955 it amounted to at least 17 per cent. While the quantum of exports of under-developed countries increased by some 30 per cent, from 1955 to 1961 the value of their exports has risen by only 16 per cent, and much of this reflects the rise of petroleum exports — which only benefited Venezuela and a limited group of countries in the Middle East. Excluding the exports of these countries, the increase in the value of the total exports of the remaining under-developed countries of the world was a little over 10 per cent in the last six years, or only about two-thirds of their population increase during the same period.² The rise in the purchasing power of these exports *in terms of manufactures* has been only 5 per cent. Their foreign earnings have thus failed to keep pace with the growth of their

populations, let alone to afford the basis for a rise in imports *per capita*, which is an essential requirement for continued economic development.

2. PROSPECTS FOR THE 1960's

Various estimates made recently on the future trend of prices of primary commodities³ agree in the view that if no special action is taken, the longer-run prospects for the under-developed countries will continue to be unfavourable. This is due to a combination of adverse circumstances:

(a) There has been a considerable increase in acreage yields due to technological improvements in the production of a large number of commodities which is likely to continue at an accelerated pace. Added to this, the favourable prices of the early 1950's have led to a large increase in plantings in many areas which are only now beginning to come into production.

(b) The world market prospects for many tropical products and for some of the raw materials produced by the under-developed countries are unfavourable, owing to the increasing substitution of synthetic materials and to a change in the pattern of industrial production in the developed countries, which caused a decline in the relative importance of industries that are heavily dependent on imported materials.

(c) The consumption of many tropical foodstuffs (such as tea and coffee) seems to have reached saturation levels in some of the high income areas. There is considerable scope for increased consumption in the less prosperous and fast-growing areas (such as Japan) as well as in the USSR and other communist countries, but it is uncertain how far the economic policies of these latter countries will permit greatly increased importation of such products.

(d) Finally, there is the further threat of a narrowing

* This paper was written by Professor Kaldor at the request of the secretariat of ECLA during his visit to Santiago in December 1962. The views expressed are not necessarily those of the Organization which publishes the *Bulletin*.

¹ Some might suggest that this deterioration started even earlier, i.e. with the end of the short-lived boom in prices caused by the war in Korea in 1951, but the prices ruling in 1951 were exceptional in the light of the experience of earlier years; if one views the experience of the postwar period as a whole, the unfavourable turn in the position of the under-developed countries may be said to have started in 1954-55.

² Figures derived from the United Nations *Monthly Bulletin of Statistics*.

³ See in particular *Agricultural Commodities - Projections for 1970*, FAO Commodity Review 1962; *Study of Prospective Production of and Demand for Primary Commodities. Prospective Demand for Non-agricultural Commodities*, United Nations, 1962 (E/3629-E/CN.13/49).

of markets due to trade diversion resulting from the preferential arrangements of the European Common Market in favour of their overseas associates in Africa and the Caribbean. If these preferential agreements secure high export prices for the commodities produced inside the area, they are likely to lead to considerable increases in production, which in turn will narrow considerably the market for other exporting countries.

Even without taking into account the additional production generated by measures of trade diversion, there can be little doubt that the under-developed countries are confronted with the danger of a structural over-production for a number of tropical products and raw materials. The only remedy to this situation is a change in the structure of production of the under-developed countries and the diversification of their economies, which lessens their dependence on the export of a small number of minerals or plantation crops. But this is clearly a long-term remedy and its effective application requires co-ordinated action by the under-developed countries themselves. This is because acting individually each country is under a strong temptation to increase the production of its own export crops, even of commodities whose prospects are known to be unfavourable, so long as this offers an immediate promise of increased export earnings for the particular country concerned. Moreover, the prospects of any planned diversification of the economies of the under-developed countries will be seriously compromised by the very fall of their export earnings which is likely to result from a continuation of the current trend of prices. The lower their earnings are, the less they will be able to undertake the investments necessary for any major change in their production structure.

In order to bring about such a planned re-organization in the structure of production, two kinds of arrangements are therefore essential. The first is to stabilize commodity prices at a level which is in some reasonable relationship to the prices of manufactured goods. The current prices of primary products may be regarded as being already unduly low in this context. If the prices of primary products were stabilized at, say, the 1955 level — which is about 10 per cent above their current level — the terms of trade would be about 5 per cent worse than those which were obtained in the year 1938, therefore they would still be considerably lower than those of 1928 i.e. before the great depression of the 1930's.

The second requirement (which is of course closely connected with the first) is that satisfactory arrangements be made to limit the production and exports of individual commodities to the extent needed to bring production and consumption into balance at a satisfactory level of prices.

Both these objectives could best be promoted by international commodity agreements — the type of instrument in which the main reliance has been placed by both developed and under-developed countries, ever since the end of the war. But despite all the effort which went into the making of such commodity agreements during the last seventeen years — as reflected in innumerable international conferences, consultations or study groups for a large number of commodities — only five operative agreements have been concluded — for wheat, sugar, tin, coffee and olive oil — and of these only two remain in effective operation at present (tin and coffee);⁴ and

there have been only three (those for sugar, tin and coffee) which could be said to have succeeded, at least during some part of their period of operation, in stabilizing prices at a higher level than would have been attained without them.

As a result of a growing dissatisfaction with the very limited results attained in individual commodity agreements, attention has increasingly turned to alternative methods of remedying the situation in the form of compensatory financing schemes. These would not attempt to stabilize the prices or to regulate the trade of individual commodities but would provide instead some financial compensation (in the form either of gifts or of loans) for the fall in export earnings, financed by a universal levy on both exporting and importing countries.⁵

3. THE EXPERIENCE OF POSTWAR COMMODITY AGREEMENTS⁶

Before we can discuss what is the most promising approach to the solution of this problem, it is necessary to analyse the causes of the very limited success of the numerous commodity negotiations since the war.

One of the reasons often cited lies in the limitations under which postwar commodity negotiations have been conducted. The guiding principles for commodity negotiations were laid down by the Havana Charter of 1948 — a treaty which was never ratified but whose major provisions in this field have been, and still are, generally observed. The Havana Charter states that one of the main objectives of international commodity agreements is “to prevent or moderate pronounced fluctuations in the price of a primary commodity, with a view to achieving a reasonable degree of stability on the basis of such prices as are fair to consumer and provide a reasonable return to producers, having regard to the desirability of securing long-term equilibrium between the forces of supply and demand”.⁷ The Charter also specifies that “participating countries which are mainly interested in imports of the

in force, no longer provides for purchases at guaranteed minimum prices.

⁵ Details of two such schemes have been published recently. The first is by a group of United Nations experts (*International Compensation for Fluctuations in Commodity Trade*, United Nations Publication, Sales No. 61.II.D.31, New York, 1961), and the second by the Organization of American States, which put forward a proposal for the establishment of an international fund for the stabilization of export receipts. The United Nations report states that participants should be entitled to compensation of 50 per cent of the fall in their export earnings as against the previous year in excess of a minimum reduction (for which no compensation would be payable) of 5 per cent, financed by contributions based on a percentage of the national income of the high income countries and a percentage of the export receipts of the low income countries. The United Nations experts suggest that such compensation should take the form of non-repayable grants, and they estimate that if this scheme had been in operation in the years 1953-1959, the under-developed countries would have received a net annual transfer of 240 million dollars from the high income countries. The OAS proposal is that compensatory finance should be available up to a maximum of 20 per cent of previous exports to cover a proportion (up to a maximum of two-thirds) of any shortfall of export receipts below that of the average of the previous three years. It is proposed that the compensation should take the form of loans to be repaid in a maximum of five years, irrespective of the subsequent movement of export proceeds of the borrowing countries.

⁶ The following owes much to Gerda Blau, *International Commodity Arrangements*, paper presented to the International Congress on Economic Development, Vienna, September 1962.

⁷ Article 57 (c).

⁴ Apart from the International Wheat Agreement which, though

commodity concerned shall, in decisions on substantive matters, have together a number of votes equal to that of those mainly interested in obtaining export markets for the commodity".⁸

In other words, the provisions of the Havana Charter prescribed that producers and consumers should have equal weight in conducting the negotiations and in shaping the provisions of any commodity agreement. They also laid it down (in effect) that the main purposes of such agreements are to moderate any pronounced fluctuations in prices; not to interfere with long-term trends that may be necessary for securing "long-term equilibrium" between the forces of supply and demand.

These guiding principles have been interpreted (at least by the developed countries) in a manner that has unduly limited the scope of such negotiations. The main interest of the producing countries has been in obtaining both stable prices and satisfactory terms of trade in respect of manufactures — in the same way in which agricultural producers of the developed countries demand, and generally obtain, such terms, either through guaranteed prices (as in the United States or the United Kingdom) or through measures of agricultural protection (as in Continental Europe). But the Governments of the main importing countries were, not unnaturally, unwilling to extend to the primary producers of foreign countries the same kind of support as regards prices or guaranteed markets which they were ready to grant to their own agriculturists; and they also discouraged attempts by the producing countries to secure these ends by themselves through concerted regulation and control of market supplies. Thus the pre-war type of commodity agreement — which mainly relied on a restriction of exports by producers — was at first frowned upon as contrary to the liberal principles of the Charter, partly because it was held that by restricting production and maintaining high prices such agreements tended in the long run to restrict consumption as well, and partly because they inevitably tended to freeze the pattern of production and trade in a commodity, and thereby prevent the realization of one of the objectives laid down in the Havana Charter, that of "increasing opportunities for the satisfaction of requirements from sources which can produce in the most effective and economic manner". The only postwar agreement which mainly relied on export restriction for its operation was the International Sugar Agreement of 1953. But sugar has always been recognized as constituting a special case, and the 1953 Agreement was largely a continuation or renewal of a similar Agreement concluded in 1937. In the case of coffee an analogous agreement — comprising both exporting and importing countries — could not be concluded until 1962.

The authors of the Havana Charter evidently had two kinds of commodity agreement principally in mind which

⁸ Article 63 (b). The Charter also lays down (Article 62) that "commodity control agreements" (i.e. agreements which involve the regulation of production or the quantitative control of export or imports, or the regulation of prices) may only be entered into after an international commodity conference, called specifically for the purpose, has found that (a) a "burdensome surplus" has developed or is expected to develop in a primary commodity which would cause serious hardship to small producers, and which could not be corrected by normal market forces; or (b) widespread unemployment or underemployment in connexion with a primary commodity has developed or is expected to develop, which would not be corrected by normal market forces owing to low elasticities of demand and the lack of alternative employment opportunities.

were thought to provide the possibility of "moderating pronounced fluctuations" in prices, but without necessarily interfering with the long-term operation of the free market. One of these was the creation of international buffer stocks for particular commodities and the other a multilateral contract or guarantee, by both exporting and importing countries, to buy or sell at least part of their normal requirements or supplies within a stipulated range of prices, irrespective of the level of prices in the free market. As it turned out, neither of these two types of agreement offered much scope for successful international negotiations.

(a) Buffer stock agreements proved extremely difficult to negotiate, as they would have required financial resources for their successful operation beyond the reach of producers and beyond the willingness of consumers. The only international buffer stock agreement which actually materialized was the international Tin Agreement of 1956, and as the subsequent history of its operations shows, its success was due, not to the buffer stock scheme but to its provisions relating to export control, which were originally intended as subsidiary. The financial resources of the buffer stock authority were exhausted in less than two years after the inception of the scheme, and in the two following years the price was maintained by a heavy restriction of exports by the producers (a reduction of 41 per cent in the first full year of export control and of 36 per cent in the second full year; after that the world demand supply situation changed so that it was possible to maintain the price above the support level without restrictions).

(b) The only known instance of a multilateral contract guaranteeing purchases and sales within a range of stipulated prices is the International Wheat Agreement, originally negotiated in 1949. In the four years covered by this Agreement the world price was consistently above the maximum price stipulated in the Agreement, so that the Agreement was effective in securing supplies to the participating importing countries at lower prices than they would have paid otherwise. However, this Agreement operated entirely in the interest of the importers; and when the exporters insisted on some increase in the maximum price for the second four-year period (from 1.80 to 2.05 dollars per bushel) the largest importer, the United Kingdom, withdrew from the Agreement, and was later followed by other participating importers. The Agreement was re-negotiated for a third time in 1959, but its price-stabilizing features were virtually abandoned. The history of the Wheat Agreement thus shows that it is unsafe to rely on the willingness of the high-income importing countries to guarantee to pay higher prices for their imports than they need to pay in the free market.

On the other hand, the International Sugar Agreement of 1953 was successful during most of its period of operation in stabilizing world prices around 3.75 cents per lb. This Agreement, whilst it conformed to the formal requirements of the Havana Charter in giving equal voting rights to both exporting and importing countries, was essentially an agreement to restrict exports by means of quotas, on the same lines as its predecessor, the International Sugar Agreement of 1937. Each country was given a "basic quota", the actual quotas being expressed as a percentage of this, fixed in the light of estimated requirements each year. The main novel feature of the 1953 Agreement was that it provided for an *automatic* adjustment of the actual export quotas upwards or down-

wards, whenever the price of sugar rose above a stated maximum, or fell below a stated minimum, for thirty consecutive days. (Later on this was amended to allow for both automatic and discretionary adjustments of the quotas at various points within the initial zone of stabilized prices.)⁹ The main obligation on importers (in both the 1937 and the 1953 Agreements) was to reserve a certain minimum percentage of their total import requirements for participating exporters. Exporting countries were obliged to take measures to restrict their production whenever their stocks exceeded 20 per cent of their output, but the manner of implementing this obligation was left entirely to the particular Government concerned.

Although the International Sugar Agreement of 1953 covered only one-half of the world's trade (the rest was covered by special arrangements such as the United States preferential import arrangements or the Commonwealth Sugar Agreement) it was successful (except for a brief period after the Suez crisis) in stabilizing prices within the stipulated range through the regulation of supplies. However, when after the cessation of United States purchases of Cuban sugar the pattern of world trade changed suddenly and drastically, the Agreement broke down owing to the inability of exporters to agree on a new distribution of export quotas and its operative provisions are at present suspended.

The new International Coffee Agreement of August 1962 (which succeeds two earlier one-year agreements negotiated among producing countries only) follows, in its general outline, the provisions of the International Sugar Agreement, except that the adjustment of the actual quotas in relation to the "basic quotas" is not tied to the movements of the world price, but is left to the quarterly decision of the Council, the obligations relating to prices being confined to "assuring that the general level of coffee prices does not decline below the general level of such prices in 1962", and "assuring to consumers prices which are equitable and which will not hamper a desirable increase in consumption". The participating importers undertake to limit their imports from non-participants, whenever the exports of participants fall below 95 per cent of the total world exports of calendar year 1961.¹⁰ Exporting countries similarly undertake to limit their production to the amounts needed for domestic consumption, exports and stocks, but the policies and procedures to be adopted in this connexion are left entirely to the individual country concerned. There is a provision for a review of the distribution of the basic quotas after three years, and for their revision by the Council subject to a two-thirds majority vote of the exporters and importers; failing that the initial quotas will remain in operation for the remaining two years of the Agreement.

4. LESSONS AND POLICIES FOR THE FUTURE

The above outline of the postwar experience with commodity agreements suggests two main conclusions:

⁹ Apart from allotting a special quota as a reserve from which the Sugar Council could allocate additional quotas to new producers (or increased quotas to existing producers) and the automatic pro-rata re-allocation of unutilized quotas, this Agreement contained no provisions for a systematic periodic review of the distribution of "basic quotas".

¹⁰ This Agreement has still to be ratified, and its entry into force is dependent on at least 20 exporting countries representing at least 80 per cent of world exports, and at least 10 importing countries, representing at least 80 per cent of total world imports, acceding to it.

(a) Of the various types of international commodity arrangements that have been considered, international agreements for the regulation of the export and production of primary commodities provide the most promising instrument for stabilizing the terms of trade of under-developed countries and assisting them in an orderly adjustment of their production structure. If it is objected that such agreements tend to create monopolistic conditions in the marketing of the commodities concerned, it should also be borne in mind that the under-developed countries are themselves confronted by such monopolistic markets in their purchases of manufactured goods — where prices are kept at higher than competitive levels by international private cartels or simply by the absence of price competition among producers, operating in imperfect markets.

In fact, the sellers of primary commodities suffer from two important handicaps in comparison with those who sell manufactured goods. The first is that by and large, the primary producers are "price-takers", whereas industrial producers are "price-makers". A fall in demand for manufactured goods leads directly to a reduction of output; any reduction in prices occurs only indirectly and incidentally, depending on the extent to which producers are induced to lower profit margins. A fall in demand for primary commodities, on the other hand, leads directly to a fall in prices; it leads to a restriction of output only indirectly, in so far as the decline in prices causes producers to lower their output. The second handicap is that whereas the benefits of technical progress in manufacturing are largely retained by the producers (in the form of higher real wages and profits) the benefits of technological progress in primary production are largely passed on to the consumers, in the form of lower prices, leaving little benefit to the producers in the form of a higher real income.¹¹ (The exceptions to this are to be found in those cases — such as oil — where the distribution of the commodity is controlled by large international concerns.)

The creation of "producers' cartels" for primary commodities would serve to lessen the structural handicaps of under-developed countries resulting from differences in market structures and market organization — a state of affairs which turns the terms of trade against them, and makes them poorer, without any compensating advantage from the point of view of the total wealth produced by the world as a whole. The prices resulting from the operation of unrestricted competition are only commendable from the point of view of the optimum allocation of the world's resources, in a world where *all* markets are equally competitive.

(b) The second lesson to be drawn is that the prejudice, or opposition, of importing countries in respect of export-restriction agreements *can* be overcome, once it is demonstrated that a sufficient number of the exporting countries are determined to come to such an agreement in any case (this was shown in the negotiations leading up to the International Coffee Agreement). Faced with the alternative of a one-sided cartel agreement of the producers, it is clearly in the interests of the importers to

¹¹ This is partly due to the prevalence of imperfect competition in manufacturing, and partly to the fact that organizations of industrial workers are in position — unlike workers in the agricultural sectors of under-developed countries — to ensure that industrial wages increase at least as fast as industrial productivity.

participate, and thereby acquire an influence in shaping the basic provisions as well as the policies of the Council operating the Agreement — quite apart from the wider interest in helping under-developed countries on broad humanitarian considerations. (It is also in the interests of the exporters to have the importers included, since they alone can guarantee access to markets, and ensure compliance among the exporters.) Hence the negotiation of export-quota agreements (of the type of the sugar and coffee agreements) for all the principal primary commodities produced by the under-developed countries is largely a matter of securing adequate co-operation and co-ordination of policies among the different exporting countries. Once the exporting countries are prepared to form a "trade union" of some kind, the opposition of importing countries will cease to be an effective obstacle.

However, if such export-control agreements are to become the major instrument for regulating and stabilizing the terms of trade of under-developed countries, not just in times of "emergency" but more or less as a permanent measure, they must provide for more efficacious and flexible techniques for adapting both the structure of production to the requirements of world trade, and the structure and pattern of trade to the changing conditions of production than either past or existing agreements have succeeded in doing.

It is well known that export-quota agreements are difficult to negotiate and if brought into being, are likely to break down sooner or later, for one of three reasons or a combination of them:

(a) *Failure to secure full participation by all the producing countries.* The larger the number of exporting countries which accede to an agreement, the greater the temptation for the remaining exporters to stay out, since the restriction of the exports of the others gives them the benefit of better prices, without their being restricted in the development of their own exports. On the other hand, as pre-war experience has shown, countries which are willing to participate in an agreement are not likely to tolerate for long encroachment by outsiders on their markets; if the agreement leads to a gradual reduction in the share of world trade of the participating exporters, it is likely to break down sooner or later.

(b) *Failure to regulate the domestic production of the exporting countries leading to the accumulation of excess stocks which the participating countries are financially unable to carry.* If at the prevailing (domestic) price the production of any particular country exceeds its requirements for domestic consumption and exports, and the excess is purchased by a government agency which holds it in stock, the incomes generated by the production of the export commodity will exceed the export receipts; and this will be reflected in an adverse balance of payments, or in domestic inflation, or both. The maintenance of the domestic price will also militate against the structural adjustment and diversification of the economy which the agreement was designed to facilitate. The carrying of excessive and growing stocks imposes an increasing strain on the operation of the agreement, and an increasing temptation to evade it or to abrogate it.

(c) *The impossibility of "freezing" the pattern of world production and trade for more than a limited period.* It is inevitable that the initial distribution of export quotas should follow more or less closely the actual distribution of exports in the year (or years) prior to the first negotiation of the agreement. But the pattern of world trade

— which in the absence of international regulation would constantly tend to change, as the production and exports of low-cost areas, or areas showing a high rate of productivity growth expand at the expense of other areas — cannot be artificially "frozen" in this way for more than a limited period.¹² Unless the agreement provides some mechanism for a steady adjustment in the distribution of the quotas in the directions in which the *pattern* of trade would have changed in the absence of regulation, the agreement is bound to break down at some point — at the point where the "low cost" producers feel that they have more to gain from the expansion in the share of their trade under free competition than they have to fear from the fall in prices that will accompany that process.

All these defects *can* be overcome, however, once the nature of the problem is sufficiently understood, and the participating exporting countries are fully apprised of both the requirements and the advantages of obtaining a solution.

(a) As regards the problems of securing full participation, this is partly a matter of "bringing home" the advantages of a commodity agreement to *all* (actual or potential) exporters, which of course partly depends on the provisions made in the agreement itself for securing in the long run a growing share of world trade to the fast-growing, low-cost areas. But it also depends on the extent to which the major importing countries are willing to participate in the scheme; as was pointed out earlier, if the importing countries are willing to limit their imports from non-participants to their existing share of such imports, the major obstacle to securing full participation is removed. The willingness of importers to participate and to undertake such obligations will depend, of course, on how far the exporters are ready to regulate the actual quotas so as to stabilize prices at levels which are "fair to consumers" as well as providing a "reasonable return to producers", and as the example of the Sugar Agreement has shown, it is possible to get agreement on the automatic variation of quotas so as to keep prices within the desired zone.

(b) With regard to the prevention of excessive accumulation of stocks, both the sugar and coffee agreements, as we have seen, impose an obligation on exporting countries to regulate their domestic production so that it does not exceed their requirements, but they leave the manner and method of such regulation entirely to the countries concerned; nor are there any sanctions on countries which fail to implement this obligation effectively. It would not be unreasonable to impose an obligation on exporting countries to the effect that such regulation should be by means of a *variable export duty or export levy*, or at least that such a variable export duty or levy should form *at least one* of the instruments of production control. Without prescribing what the level of such a duty should be, the participating exporters could be asked to increase this duty in the face of any persistent excess of production over requirements and to decrease the duty whenever there are persistent shortages (and/or the countries con-

¹² The history of most commodities shows dramatic changes over longer periods in the distribution of the sources of supply and the channels of trade. The main centre of rubber production shifted from Brazil to Malaya; of coffee from Arabia to Brazil, and (lately) to Africa; of cocoa from Central America to West Africa; of tea from China to India and Ceylon, etc. The share of African countries in world coffee exports has increased from 3 to 20 per cent in recent years.

cerned are unable to utilize their full quotas) and to continue raising or lowering the duty until the disequilibrium is eliminated. For example, the obligation might be to increase the sum of export duties and levies¹³ by an amount equal to 10 per cent of the f.o.b. price of the commodity whenever domestic stocks increase by more than 10 per cent of output over a period of, say, three years and when total stocks carried exceed, say, 30 per cent of the average annual output of the previous three years; and there should be a similar obligation to decrease the sum of export duties and levies by, say, 5 per cent, of the f.o.b. price whenever the total stocks carried fall below 10 per cent of the average output of the previous three years (any unutilized amount of the export quotas being reckoned as a deduction from stocks).¹⁴

These provisions would ensure that market forces were utilized to the maximum possible extent in securing the required adjustments in production. Market forces alone may not of course always be sufficient to bring about the degree and the kind of adjustment required in the absence of other complementary instruments of regulation. For example, in the case of commodities with a long gestation period, short-period output may be quite inelastic with respect to price, and excessive price variations in the domestic price of the commodity may set up cobweb-type reactions. In such cases the export duty should be set so as to reflect the difference between the export price and the long-run domestic cost of production of the commodity, and other instruments should be employed for dealing with short-period maladjustments. To the extent that governments regulate production by methods other than changes in the internal price (acreage-restriction subsidies, for example) the need to vary the internal price through variations in the export duty will be correspondingly lessened, or may be avoided altogether. But a provision on the above lines would ensure that participating countries would be obliged to cut (or raise) the internal price in *the last resort* — i.e. if other methods of regulation failed to be effective.

Variable export duties or levies are already widely employed, mainly as a means of stabilizing the internal price in the face of fluctuations of the external price, or simply as a method of collecting revenue. In the scheme envisaged here their function would be different. The external price would be stabilized by the operation of the export restriction agreement itself, and the purpose of the variable export duty would be to regulate internal supplies so as to keep pace with external requirements, and thus assist in the necessary structural readjustment of the economy. There may be a political objection against

this —precisely on the grounds that it fails to maintain the internal purchasing power of the farming population (though this argument loses much of its force when the increase in production is itself the consequence of a rapid growth of productivity). But if high prices lead to excessive production, the desire to secure an adequate income for farmers by buying their crop at a high price and the desire to maintain satisfactory terms of trade in the world market are incompatible — as the recent example of Brazil has shown. If governments wish to maintain the farmers' purchasing power it would surely be much better to do this by means of subsidies administered in a manner that would promote the necessary re-organization of agriculture instead of obstructing it — e.g. by subsidies on the acreage devoted to food production for home use, or on the produce of such acreage, or by developing alternative export crops for which there is still an unsatisfied world demand.¹⁵

(c) It is obvious that a scheme of this kind will only be found acceptable if the agreement also provides for a systematic redistribution of the basic export quotas by small and gradual steps in favour of the most efficient producers. The governments of the relatively efficient low-cost producing countries could hardly be expected to carry out the self denying ordinance of discouraging their farmers by low prices — and the more efficient their farmers the lower these prices must be — unless they can look forward, in the long run, to the prospect of raising their exports by obtaining a growing share of the world market. If such an adjustment in the distribution of quotas is to proceed in a smooth and orderly manner it must be based on *objective* criteria that are specified in the agreement itself and not left to subsequent *ad hoc* negotiation. Fortunately the scheme of variable export levies provides such a criterion: once each country attains the export duty which keeps its domestic production in balance with its requirements, the level of that duty (in relation to the f.o.b. price of the commodity) gives a clear indication of the domestic cost of production, or supply price, of the commodity, in terms of international currency. Hence the heavier that duty for any particular country in relation to the average, the lower the costs of production of that country in relation to the average costs of all producers.

It is suggested therefore that after the lapse of some initial period (say, three or five years) during which the "basic quotas" remain unchanged, there should be an annual re-distribution of quotas in favour of countries whose net export levies (reckoned either simply per ton

¹³ The meaning of "export duties and export levies" will need careful definition. Apart from a formal export duty levied at the ports, fees charged for export licences should be treated as an export levy, as should also the profit on the operation of a government-owned marketing or purchasing agency; the losses, on the other hand, should count as a negative levy, or a subsidy, and should be deducted from other duties or levies charged. Allowance would also have to be made for differential exchange rates in cases where the proceeds of exports are converted into local currency at a different rate from that charged on imports.

¹⁴ This scheme would thus allow for a considerable variation of stocks in relation to output without calling for remedial measures. It would allow for any bumper crop or any crop failure due to weather conditions which is likely to be reversed without any price incentives subsequently. The difference between the minimum increase of duty of 10 per cent and the minimum decrease of duty of 5 per cent is intended to take into account the greater responsiveness of producers (in the short run) to price increases than to price decreases.

¹⁵ It has also been suggested that instead of the exporting countries imposing export duties, the importing countries should impose a variable import levy on the imports of primary commodities — the levy being varied so as to stabilize the prices paid by the consumers of the importing countries — the proceeds of which, subject to suitable safeguards, would be remitted to the producing countries. From the point of view of the primary producing countries it would obviously be less satisfactory to have responsibility for stabilization rest on the action of the importing countries, and to be dependent on the remission of the receipts from import levies which would be bound to be hedged round by various conditions. (A variable import levy forms of course the principal instrument for stabilizing the common internal agricultural price of the E.E.C. countries. The Rome Treaty envisages however, that the proceeds of this levy are to be retained by the importing countries for subsidizing their own agricultural producers; and to the extent that the levy encourages the increase in agricultural production inside the Common Market area, it will also reduce the size of the market of the exporting countries.)

or as a percentage of f.o.b. prices) are greater than the average, and at the expense of those countries whose net export levies are less than the average.¹⁶ No country's basic quota should be increased by more than, say, 5 per cent, in any one year, the actual increases among the various countries being distributed according to some logarithmic formula, based on the percentage excess of their export duties over the average. Only countries which have been able to make full use of their existing quotas should be entitled to any increase in quotas.¹⁷ Similarly, no country should have its basic quota cut by more than, say, 5 per cent in any one year, the actual cuts being distributed in the same way in accordance with the shortfall of the level of export duties below the average, subject to the proviso that the total reductions of all countries whose quotas are cut should represent not less than (say) 21½ per cent of their aggregate basic quota, the sums of the increases in quotas being equated sums of the reductions. (These adjustments in the *basic* quotas are of course additional to, and independent of, the change in the *actual* quotas, expressed as a percentage of the basic quotas, which are decided quarterly by the Council, and distributed on a *pro rata* basis.)

This system would give a strong incentive to each participating exporting country to rely on export duties (or levies) as the main instrument for regulating domestic production, since the higher its export duties are, the greater its chance of obtaining a gradually increasing share of world exports. At the same time, a country would not benefit by making its export duty excessive, since in that case, it would be unable to fulfil its existing quota, and would not be entitled to any increase in its quota.

Since the countries whose basic quotas are increased under this scheme would gradually be forced to reduce their export duties (otherwise they would be unable to make full use of their quotas) while the countries whose basic quotas are reduced would be forced to increase them (otherwise they would accumulate excessive stocks) the continued operation of the scheme would lead to a *gradual equalization of the level of export duties among all participants* — which means that it would tend to bring about the same distribution in the pattern of production and trade as would come about in an ideally functioning competitive market, but without the price fluctuations and uncertainties involved in the latter. It would thus combine the flexibility of a free market system

¹⁶ The average would need to be calculated as weighted average — the export quotas serving as weights.

¹⁷ This makes it impossible for countries to obtain higher quotas by raising their export levies to excessive levels.

with the maintenance of stable and remunerative world prices.

There is no reason why this system should not be extended to a wide range of commodities — including those (e.g. cotton) where different countries produce widely differing grades and qualities. It is less promising for those commodities (e.g. rice or wheat) which are mainly produced for domestic consumption, and where the exports are marginal to domestic requirements. It may therefore not be the ideal method for dealing with the problems of temperate-zone foodstuffs. But such commodities are largely produced by the developed, high-income countries; with the exception of rice, the commodity exports of most under-developed countries consist of commodities the bulk of which is destined for export, and only a relatively small part for domestic consumption.

One of the principal difficulties with international commodity arrangements since the war has been the lack of agreement among countries — particularly as between exporting and importing countries — as to the basic objectives which such arrangements should serve, and as to the techniques of regulation by which the objectives were to be attained. If the coming United Nations Conference on Trade and Development could come to an agreement on principles to be followed in the regulation of commodity trade and production that are both more explicit and more broadly conceived than the provisions of the Havana Charter, the way would be opened for tackling the problem of the terms of trade of the primary producing countries in a more comprehensive manner by arranging for the simultaneous negotiation of a large number of commodity agreements on parallel lines.

It is not suggested of course that the attainment of stable and satisfactory terms of trade is the only problem facing under-developed countries in the field of international trade. The restriction of the size of their markets through heavy revenue duties (or protective duties) in the importing countries, or as a result of discriminatory arrangements favouring particular group of producers (as for example the preference granted by the Common Market or the Commonwealth) represent further problems whose solution will no doubt form one of the principal subjects of discussion at the coming international trade conference. Another equally important problem is to secure relatively free access for the exports of manufactures of under-developed countries in the developed, high-income countries, which are bound to play an increasingly important role with the passage of time. These wider problems may require a recasting of the institutional arrangements in the field of international trade that were created after the war.

GENERAL SITUATION AND FUTURE OUTLOOK OF THE CENTRAL AMERICAN ECONOMIC INTEGRATION PROGRAMME*

1. GENERAL REVIEW OF THE PROGRAMME

1. INTEGRATION AND THE ECONOMIC SITUATION IN CENTRAL AMERICA

In August 1952 the Central American Governments established the Economic Co-operation Committee, which at its first session laid down the principles governing the integration programme. The ECLA secretariat believes that the time has now come, ten years later, to review briefly the results which have been achieved slowly over the intervening period. This review is made for the purpose of providing the Committee with a basis for determining which are the major problems and for formulating the measures needed to consolidate and extend the integration achieved thus far.

The recent accession of the Republic of Costa Rica to the General Treaty and to the other instruments on economic integration means that the coverage of this Treaty is now complete. The participation of Costa Rica, in addition to fulfilling the hopes of all the Central American Governments, also satisfies one of the requirements of integration, namely to provide an economic market basis sufficient to permit an industrial development that thus far has been lacking or has been barely perceptible in Central America. The common market has at its disposal instruments for action that are highly effective for the purpose not only of accelerating the real integration of the Central American economies, but also of offsetting some of the factors that in recent years have acted unfavourably on the economic situation.

Free trade has opened one new channel for the expansion of productive activity. In addition there is a common tariff built up on the basis of the true situation in the Central American countries, and with a view to development. There are also Central American institutions in the fields of finance, industrial technology, and even teaching and administrative training. The Economic Council, the Executive Council and the permanent secretariat of the General Treaty constitute a solid background for the efficient functioning of the common market and the progress of integration. In addition to these elements, which have grown up as a result of economic integration and form part of that integration, there are such favourable factors as the decision of the Central American Governments to undertake the planning of development in their countries in a co-ordinated form and on a regional basis, and the prospect of the immediate initiation of a new stage of intensified public investment and the existence of sources of external financing additional to those that have been available hitherto.

All these three factors constitute effective instruments of economic action, but for an accurate appraisal of their

possible effect on the Central American economies they cannot be considered separately. Economic integration, development programming and public investment and its financing, must all be viewed as part of a single mechanism designed to accelerate the region's growth. As with any development effort, this calls for the combined and simultaneous action of all components so as to reap the rewards of this effort, on the basis of common fundamental aims and co-ordinated methods of application.

Side by side with these encouraging features there exist in Central America unfavourable economic conditions that have tended to worsen during the last few years. In other words, it is clear that economic integration has reached a high point in terms of results and prospects, but that the economy as a whole is going through a period of waning activity. The product growth rate is barely enough to offset the population increase, and in some cases is at the moment lower than the population growth rate.

All the foregoing suggests the possibility of bringing into play the instruments already available to the Central American Governments for invigorating the economy by offsetting the effects of the deterioration in the external sector. This cannot be done completely, since the structural features that determine the present situation are firmly built in the various countries, and could not be changed in the short run. The general objectives of integration can really be attained only gradually, although the rate at which the process is achieved should be modified by the use of the existing political instruments.

Recent experience shows that trade within the Central American countries is relatively independent of the factors that tend to depress economic activity in general. In the last five years, when the product grew at an annual rate of only 4 per cent, exports within the region increased at an annual average rate of 20 per cent; their value rose from 8.6 million dollars in 1950 to 32.7 million in 1960, making possible a level of economic activity that could not otherwise have been attained.

2. THE COMMON MARKET AS A STARTING POINT

The stage of making treaties, and of designing the framework within which the integration of the Central American economies must take place, may be considered virtually completed. Full free trade has been decided on for most products, and for the remainder it has been laid down what are to be the characteristics, time-limits and rates of liberalization to be applied. Thus the common market operates in an automatic way which obviates the need for negotiations or any additional agreements of a general nature. Not only has economic integration been completed from the geographical and institutional standpoint, but it has already attained the operative stage. Yet

* This report was submitted by the ECLA secretariat to the eighth session of the Central American Economic Co-operation Committee, held at San Salvador, El Salvador, in January 1963, as document E/CN.12/CCE/265.

these results constitute a new starting point rather than the completion of a task.

Since the General Treaty is only of recent application, the effects of the common market have been to enable the five national economic systems to operate more efficiently, rather than to lead to any form of consolidation of these systems. Only a limited improvement can be achieved on the basis of national economies that resort to the common market as a source of possible additional export opportunities. The improvement needed is of a general nature involving a transformation of the existing economic systems, and it cannot be fully achieved if the national forms of production become firmly ensconced. Economic integration, as conceived by the Governments, is not a means for improving five national systems at a low level of development, or a marginal opportunity to enable those systems, while preserving the same features, to mitigate some of the anti-economic features inherent in their structure. The very essence of integration is the fusion of these national economies, on a progressive basis, into what in practice would amount to an economic system of regional scope.

The existence of wide disparities as regards basic capital resources and the fund of technical knowledge and savings available is one of the main obstacles to the gradual formation of a regional economic system. What has kept these Central American economies separate in the past is not merely a question of tariff barriers, but is also rooted in the differences between countries as regards, for examples, roads and electric power plants, and the lack of links between these facilities at the regional level. Only when such differences have been abolished will the new investment deriving from the common market tend to concentrate in the places that are the most economic from the Central American standpoint. At the same time, the existence of basic facilities that are equally satisfactory throughout the region, and that are linked together, will tend to encourage investments calculated to take advantage of the external economies established within the system.

Until such time as this levelling-up of economic conditions takes place, the investment coefficient will not fully reflect the opportunities and prospects opened up by the Central American common market. Consequently deliberate action is required with a view to stimulating the development of the various activities in the light of the outlook for the region as a whole. In order to achieve this the Central American Governments have decided to undertake the development of their countries by means of co-ordinated programming of economic activity. This implies, in addition to a full programming of public investment, a less extensive planning effort that is nevertheless sufficient to encourage private investment on a regional scale.

The actual integration of economic systems poses its own problems, which do not arise at the level of an individual country. Integration aims exist side by side with national aims. In the next stage of the programme common ground will increasingly be established between these two types of aims, especially in the major economic sectors, and progressively greater effort will be made to ensure that the various national economic bodies carry out their activities in the light of the additional prospects opened up by the common market. For this purpose what is required is not a change in the actual aims of these bodies, but a change in their scope of activity. The

work of integration should cease to be a task reserved to the regional bodies, and should be shared by the institutions concerned with banking, finance, credit, and agricultural and industrial development, that are operating in each country.

The importance of this evolution, of which the first signs are already to be seen in Central America, nevertheless goes beyond its significance from the short-term economic standpoint. The operative stage that the programme has now reached is, by its very nature, the testing stage for economic integration. Regional action by the national bodies will serve to consolidate and extend the basis of common interest on which the whole integration programme rests through the benefits to be derived by the various member countries. This is hardly a mere matter of arithmetically equal benefits; in the long term the basis of common interest will depend more on how far economic integration can accelerate growth than on any other kind of adjustment. Thus reciprocity will in essence not be a matter of compensations or adjustments, but will take the more permanent form of intensified economic growth in all the member countries.

3. THE NEW STAGE OF INDUSTRIAL DEVELOPMENT

In conjunction with the common market there have also been established, on a permanent basis, strong stimuli to industrial investment, whose effects are already being felt. What remains to be done is to ensure the economic soundness of the new investment, and its appropriateness from the standpoint of an over-all economic unit.

For the very reason that the stimuli provided by the common market are so powerful, it is more than ever imperative to avoid duplication of investment. At the national level such duplication exists in almost all branches of manufacturing, despite the small size of the markets concerned. When these markets are expanded at the regional level, in conjunction with an external tariff that is generally based on development criteria, the opportunity of profitable operation is even greater, despite failure to use installed capacity to the full. Thus anti-economic forms of industrial growth might be carried over from the national to the regional level, with harmful consequences in the way of waste of resources and virtual absence of any active competition.

The stimuli implicit in the regional scope of the market are essential because they can give rise to intensive activity by private industry leading to changes in economic structure and to specialization. But these incentives could also tend to consolidate existing conditions of inefficiency or to lead to increases in profit levels without any basic improvement in forms of production.

The spirit of enterprise, which is still inadequate but is making itself felt increasingly, may prevent this. Nevertheless, such an important matter should not be subject to any form of uncertainty as to timing or as to the form which this new outlook on the structure and functioning of industry is to take. The agencies of integration can back up the tendency that already exists in the private sector by acting as a springboard for investment on a larger scale and for the renewal and improvement of existing plant. For this purpose the programme has the Central American Research Institute for Industry (ICAITI) and the Central American Bank for Economic Integration to fall back on. Purposive action by these two agencies is only a partial solution to the problem

in question, but it is a type of measure that can help to facilitate a changeover in private industrial activity to more economical forms of operation, and that can cause the common market to open the way to expanded and more efficient production.

This function of the financial and technological agencies of the programme cannot be effective if they do not act in close accord. The financial agency cannot fulfill this function if a local or national mentality has been uppermost in the formulation and technical study of the projects submitted to it, and the technological body cannot effectively promote the formulation of economic projects on a regional scale unless there is some likelihood that this type of project will have preference in Central American financing.

The approach indicated seems all the more essential because analysis of regional trade shows that in addition to the considerable stimulus provided by free trade, there must be encouragement of changes in the industrial structure. Thus far there has been a better use of installed capacity, and the new investment in manufacturing has been designed in part for markets wider than the national markets. But generally speaking these first results of the common market might well be reinforced so that, instead of being confined to the products already produced in the region, they would also include new production sectors, especially durable consumer goods, intermediate goods and certain capital goods. Thus the first repercussions of the common market would have a broader base, whereas in regard to the goods produced at present they will tend to lose ground as Central American trade adjusts to the new conditions.

Furthermore, the forces in a market that is suddenly enlarged, as in Central America, encourage a form of import substitution mainly directed towards the items that raise fewer technical problems, and thus promote the development of consumer goods industries and processes involving little working and manufacturing. Consequently industries producing raw materials, and intermediate and capital goods, which are the industries with a real basis for future expansion, tend to be relegated to second place in the investment field. This would restrict the field of specialization and leave out of account one of the main objectives of the programme, namely, the attainment of an industrial structure that is fully integrated and capable of providing the impetus needed for moving ahead to new stages of economic development.

4. EXPANSION OF THE MARKET

While the integration programme can of itself promote a radical change in the level of economic activity, it does not yet include elements that would be equally effective in leading to a general improvement in income levels and standards of living.

The expansion of the market already effected is almost entirely due to the total of the separate demands in the five markets. In addition integration has also resulted in an increase in the general purchasing power in all these markets. Here the question is no longer one of raising the productivity of the system, which is regarded as already improved, but of ensuring that a fair share of the economic benefits obtained from integration shall be transferred to the consumer sectors. In other words, it is a matter of relative prices and incomes. The Committee

believes that this effect must be an integral part of the programme's complex of repercussions, since in the absence of this broadening action the stimuli provided by the common market would gradually tend to lose their strength.

Indeed, the present distribution of income in the Central American countries constitutes what is perhaps one of the main obstacles to rapid industrialization of their economies, and to real integration. Being concentrated in certain sectors, and otherwise spread thinly as a result of the low income situation, the market available for manufactured goods is small and does not tend to grow with the same vigour as the economic system in general. The situation thus amounts to the existence of a sector with an income so high that any increases are spent on foreign goods instead of on goods manufactured in the region, while the remaining sector, consisting of the population as a whole, has so little income that its demand does not constitute an active factor, and is concentrated mainly on essential consumer goods. Thus in addition to the economic progress made possible by integration, there must be a structural change in income distribution so as to provide properly staggered points of support for economic growth.

The improvement of income distribution in a region such as Central America, which is mainly agricultural, necessarily involves basic changes in the conditions in which the agricultural sector operates. These conditions include not only those that directly effect efficiency, and thus output, but also those that determine the pattern of the distribution of agricultural income among the various factors of production, above all forms of land tenure. These forms are rooted in the Central American economic systems, and make themselves felt in all activities, from exports to production for domestic consumption. The change or progressive adjustment of these forms in relation to a more dynamic economy of wider scope, like that provided by the common market, is calculated to provide both a link between the two major sectors that are directly productive — agriculture and industry — and a foundation for their simultaneous development. It should be noted that a problem of interrelations arises here, since the forms of tenure constitute at the same time both the causes and the results of a given stage of development.

Fiscal policy, and public investment policy in the social field, are other factors that may eventually contribute to a more economic pattern of income distribution. The Economic Co-operation Committee has been studying this problem since 1958. At the request of the Governments a United Nations mission has carried out a preliminary study, in collaboration with the Central American universities, of forms of land tenure and their significance for the economy of the region. The results of this study are not yet complete, but they already throw light on some aspects of the problem. Similarly, a detailed study of income distribution in Central America is being undertaken, and a survey is now under way of wages, costs and labour productivity, mainly in relation to manufacturing. Since 1957 the Committee's activity in the housing field has been carried out by the sub-committee established exclusively for this purpose, and its activity has increased during the past year. The composition of the labour force and demographic phenomena have been studied by technical assistance experts. Some of the results obtained are included in *Human resources of Central America, Panama and Mexico in 1950-1980, in relation to some aspects of*

economic development,¹ of which the Committee took cognizance in 1959. In accordance with the guidelines laid down by the Committee, the ECLA secretariat proposes to intensify its studies in this field, with the collaboration of the Central American universities and of the technical assistance agencies of the United Nations.

Lastly, tax reform is another method of dealing with the immediate problems of income distribution. In the existing circumstances in Central America the tax problem includes more than the question of distribution. Nor can the achievement of tax equalization between the various countries, as an integration requirement, be regarded as the most immediate goal. In this field the Central American Governments have already established full equality as regards import duties, and recently, in August 1962, they signed a Central American Agreement on Tax Incentives to Industrial Development, which eliminates the great differences that existed formerly between the five countries with respect both to the actual amount of the exemptions and to the criteria governing their application. Nevertheless there is still room for further progress towards standardization of taxes.

But the aim of tax reform, from the standpoint of the needs of economic integration, must above all be to effect structural and administrative improvements in the tax systems so as to increase their capacity to meet the new public responsibilities deriving from economic integration proper, and consequently from the policy of accelerated development of the five countries.

In 1957 the Economic Co-operation Committee adopted a resolution on this question, relating mainly to differences in taxation directly reflected as differences in the conditions of investment. On the basis of this resolution and of that adopted by the Committee at its fourth special session, what is now called for is a global approach to the problem that would include not only progressive elimination of such differences, but also actual improvement of the tax systems and their adjustment to internal and external changes in the economy, as well as the use of taxation as an instrument for a sound distribution of income.

5. CENTRAL AMERICAN ECONOMIC UNITY AND ITS LINKS WITH OTHER COUNTRIES

The plan for the progressive improvement of the machinery and methods of integration includes the establishment of a customs union between the five countries. Most of the components of this form of economic grouping already

¹ ST/TAO/K/LAT/1; E/CN.12/548. United Nations Publication, Sales No.: 60.XIII.1.

exist in Central America, or will exist very shortly by virtue of the General Treaty. Free trade and tariff equalization will be fully fledged within the next three years, and consequently a customs union in the case of Central America must set out to achieve more than can be achieved by the former two methods. It might even go further than the removal of customs barriers and the relevant administrative aspects. The progress made towards the common market will tend to liberate forces that must increasingly lead, not merely to a customs union, but, in the longer run, to the economic union of the member countries. This union will have been fully achieved when, in addition to the features that already exist, there is a common basic economic structure with respect to roads, harbour facilities and energy, and when mobility of the factors to production has been established which is the best channel for disseminating the benefits of integration and establishing a permanent basis of solidarity between the five countries.

The economic integration of Central America is already a recognized fact. It is often seen as a point of reference in analysing parallel regional problems, and it is an important factor in Latin American aspirations to set up a common market. The strengthening of the Central American market as a unit will tend in future to underline economic relations with other countries and the flow of investment. The form and manner of such relations might be the subject of study by the Committee and decisions by the Central American Governments, with a view to helping to determine that form. Just as in recent years there has been established what amounts to an inter-Central American trade policy, it would be possible to work towards the adoption of a foreign trade policy and to increasingly close links with third countries or groups of countries. The Economic Co-operation Committee and the Economic Council of the General Treaty have given consideration to these possible links, and have asked for the necessary studies to be made so that decisions on the question can be taken.

The policy referred to above could be based on the fact that the joint Central American market is not large enough to support certain industrial activities, and on the additional fact that Central America, as is widely known, suffers from a lack of savings and of technical know-how. Thus in the first place the Central American market could be supplemented by that of other countries for the products of certain industrial branches, while at the same time the ground would be prepared for agreements on investment and transfer of technologies that seem appropriate for the new industrial build-up in Central America.

II. THE INTEGRATION SECTORS

1. FREE TRADE

(a) *The evolution of trade*

Integration has advanced on a number of fronts, but its most immediate results are to be found in the field of trade between the Central American countries. During the fifties this trade increased almost four-fold, rising from a total value of 8.6 million dollars in 1950 to 32.7 million in 1960. This increase continued throughout the decade, but there were two distinct periods, one from

1950 to 1955 when growth was slower, at an annual cumulative rate of 8.7 per cent, and the other from 1955 to 1960 when growth accelerated sharply and attained an average annual cumulative rate of 20 per cent.

Together with this dynamic growth rate, the outstanding feature of the practical operation of economic integration during the decade was the independence from the behaviour of the rest of the economic system, particularly the external sector, achieved by the countries of the region in respect of trade among themselves. In fact the accel-

ated growth rate recorded during the second half of the decade coincided with the crisis in external sector prices, and with a trend towards a standstill in economic development and in exports to the rest of the world. Thus inter-Central American trade, which in 1950 represented less than 3 per cent of all foreign trade, increased by 1960 to a proportion of over 7 per cent.² However, this relative independence is of a somewhat temporary nature, being largely due to the still embryo stage of industrial development and multilateral free trade.

Between 1950 and 1955 one of the main aims of trade treaties between the Central American countries was to facilitate trade in surpluses of domestic products, especially for items of agricultural origin. In 1955-60 the scope of such treaties was enlarged to include a growing number of manufacturing products. This led to a marked trend toward a change in the composition of regional trade in the form of an increase in the proportion of industrial goods. The mere existence of the economic integration programme, and of the first multilateral treaties, created market expectation in the industrial sector that strengthened the trend towards the export of manufactured goods.

Thus qualitative and structural changes were introduced that made an increase possible in the flow of goods between the five countries. Exports of manufactured goods increased at an annual rate of only 5.2 per cent in 1950-55, whereas in 1955-60 the rate rose to 22.5 per cent. The annual growth rate for non-manufactured goods was the same during both these periods, about 15 per cent.

However, inter-Central American trade still has little effect on industrial production, of which it represents only 6 per cent. Moreover, of the increases in manufacturing, whose value rose to 70 million dollars for the decade, only 20 per cent represented exports to other countries in the region. Thus the main stimulus to industrial growth was the substitution of imports from the rest of the world, rather than inter-Central American trade.

The new trade openings led mainly to a better use of idle industrial production capacity, and only to a smaller extent to new investment in this sector. This partly explains how regional trade could continue to increase at a time of crisis in the external sector and a tendency towards stagnation in the economy as a whole.

Recently there have been signs of a trend towards a slower rate of expansion of inter-Central American trade. Thus in 1960 the increase recorded was somewhat lower (17 per cent) than the average annual rate for 1955-60. This trend continued in 1961, when total regional trade increased by 14 per cent, and according to the figures for the first half of 1962, appears to have continued in 1962.

This apparent reduction in the growth rate of exports was recorded before the Central American market could feel the effects of the full participation of Nicaragua, beginning in 1961, and of the more recent accession of Costa Rica to the common market. These developments will make for a broader geographical distribution of inter-Central American trade in future (as is well known, it has been concentrated in the past in El Salvador, Honduras and Guatemala), and for a considerable increase in the volume of regional trade.

² In 1960 the percentages of the total exports of each country represented by inter-Central American exports were: Honduras 12.0; El Salvador 10.8; Nicaragua 6.2; Guatemala 6.1; and Costa Rica 2.3.

However, the stimulus that will be provided by the functioning of the General Treaty at the Central American level will be offset by a number of unfavourable factors in the demand sphere. Firstly, much of the idle industrial production capacity is already being used. Secondly, the possibilities of substituting imports of articles produced by the traditional industrial branches of the Central American economies have largely been exhausted. The proportion of imports in the total consumption of such articles is low, in general not more than 20 per cent. Even in those industries where the margin of import substitution is broader (as in the textile industry), increased trade and import substitution as the Economic Co-operation Committee has already pointed out, involves programmes of specialization in these activities, and the investment needed to modernize equipment and expand plant. The starting point for maintaining the dynamic growth of inter-Central American trade, and making use of the opportunities opened up by the establishment of the common market, must therefore be the introduction of new activities different from traditional lines, and the general strengthening of production capacity.

A change in this direction was noted during the previous decade. Exports of manufactured goods representing new industrial branches increased from 15 000 dollars in 1950 to about 2 million dollars in 1960, and the proportion of total trade they represent increased from 7 per cent to over 30 per cent.

(b) Improvement of the free-trade system

As already indicated, the measures of the type already felt to be necessary in order to facilitate a freer flow of goods are quite distinct from the formal establishment of free trade. They are a matter of taking steps to adjust certain economic activities to the new competitive conditions of the common market and to the requirements of Central American demand in relation not only to the volume of supply but also to matters of quality and timing of supply. The first question that arises relates to the conditions laid down in the interim régimes to enable certain products to be incorporated into the free trade régime. In the case of these products, which are expressly indicated in the General Treaty, the transition to free trade depends on the signing of multilateral agreements to regulate and co-ordinate national production and supply policies, and on the equalization of the tariffs on the items in question or on the raw materials used in their manufacture. This category includes, for example, agricultural commodities for the domestic market, and some manufactured goods, including petroleum products and textile goods.

A small number of items have remained subject to trade restrictions for an indefinite period, and differ from the other products covered by the interim régimes, in that it is not envisaged that they will eventually be incorporated in the free-trade régime. However, this is not a problem relating to the improvement of the common market, but merely a problem affecting the future customs union.

The second type of measure to stimulate trade is the formation of a Central American system of transport and distribution of goods that will be capable of meeting the new requirements. In general the demand for transport services has increased rapidly, whereas the supply necessarily increases at a slower rate. This raises not only the problem of the long-term expansion of basic facilities, but

also the more immediate problem of the better organization of existing equipment and installations.

This is a field where the public authorities, and those private sectors that participate in trade movements, can promote or facilitate the establishment of permanent distribution machinery and at the same time tackle the problem of financing regional trade, especially in the short run.

At its fifth session the Economic Co-operation Committee considered several of the aspects referred to, and in resolution 67 (CCE) decided to request the technical assistance agencies of the programme to undertake the necessary studies so that at the appropriate time, conditions could be established in Central America that would be favourable to the development of regular transport services between the various countries. This question is discussed in the relevant section of the present study.³ As experience in the field of exports between the Central American countries is acquired, more will be learnt about other things that need to be done in Central America to facilitate regional trade and cut down the time and formalities required for trade operations.

The existence in the various Central American countries of special rules and regulations in health and other fields, the lack of uniform and specific criteria governing the origin of goods, and the customs regulations and formalities themselves, all tend to slow down the flow of goods and occasionally result in interruptions to trade. The General Treaty provides for regulations on the origin of goods to clarify the application of article V. This and other supplementary instruments or provisions on economic integration, in such fields as health, quality standards and regional traffic, will be more urgently needed as the common market comes more fully into force, and will be essential for the future institution of a customs union among the five countries.

(c) *Relation between the establishment of a customs union and the existing integration treaties*

In article I of the General Treaty the Contracting States agree to create a customs union in respect of their territories. From the standpoint of the internationally recognized exceptions to the application of the most-favoured-nation clause, the customs union has been defined as an agreement between States whereby there is freedom of movement of goods originating within the territory, a common tariff applying to the rest of the world, and a unified trade policy between the countries concerned and in respect of third countries.

The features referred to are already included in the Central American common market. Consequently the establishment of the customs union provided for in the General Treaty would consist, for Central America, in the adoption of additional measures; these would comprise mainly the creation of a common customs territory and the abolition of customs frontiers between the countries, the elimination of the requirements with respect to Central American origin for goods subject to a free trade regime, and lastly, the establishment of a central customs administration and the redistribution of tariff revenue among the member countries.

Several of the steps referred to relate to some of the provisions included in the integration treaties already in force. Thus, under the General Treaty, free trade is res-

tricted, during the interim period, for all the products listed in annex A to the Treaty. Once this period comes to an end the products will be automatically incorporated into the free-trade regime, except for specific goods in respect of which the Governments have agreed to restrictions for an indefinite period. For such goods the same tariff treatment will apply as that to which similar goods originating in the rest of the world are subject. The possible adoption of a customs union between the member countries would mean that the existing restrictions would have to be eliminated for as many products as possible, by means of additional agreements. With respect to those goods that for reasons of economic policy must remain subject to trade restrictions, formulas will have to be sought whose application will not involve the maintenance of frontier customs to enforce the restrictions in question. A similar situation arises as regards the products of any industries that are included in the special régime of industrial integration, since such products are subject to special forms of trade.

It should be noted, also in connexion with the relations between a possible customs union and other integration instruments, that the agreement on uniform tax incentives includes an undertaking to establish a special protocol on assembled products governing both the conditions for according exemptions and the trade régime to be applied to such products by the Central American countries. If this régime is different from the general free-trade system, this will constitute an additional question to be resolved before establishing the customs union.

This same agreement establishes national customs exemptions for imports of raw materials, semi-finished goods and capital goods for certain types of industry. The customs union will involve the application on a Central American basis of the customs exemptions granted at the national level, so that the raw materials and semi-finished goods whose imports are exempted from the payment of duty for one country can be brought in free of duty through any Central American customs frontier.

Similarly, there will have to be some study of the fiscal effects on the region as a whole, within the common system of collection of customs dues, of the granting of exemptions at the national level in sectors other than those covered by the legislation on standard tax incentives. In fact once the customs union and the common customs collection system have been established, exemptions granted by any of the States will affect not only the total of its own public revenue, but also, indirectly, the revenue of the other member countries.

The ECLA secretariat proposes to investigate further the economic significance for Latin America of the transition from a common market to a full customs union. The foregoing paragraphs give a brief account of some of the pre-requisites for a customs union in relation to the existing integration instruments. Other more general questions also require study. One essential need is to determine what should be the aims of a customs union set up with due regard to the existing conditions in Central America and to the economic policy aims pursued by Governments in relation to the integration of their countries. In this sense the establishment of a customs union will constitute not so much an agreement on trade policy, as a means of achieving a greater degree of integration of the economies, and may include new means of co-ordination in fields other than the strictly commercial sector.

³ See section 7 (d) below

2. TARIFF EQUALIZATION

In the last three years the Economic Co-operation Committee, through its Trade Sub-Committee, has built up the main part of what will be the Central American common tariff. In September 1959 the Governments signed the Agreement on the Equalization of Import Duties and Charges; in December 1960 the Managua Protocol to the Agreement on Equalization was signed, and in July 1962 a new protocol on equalization was signed at San José, Costa Rica. As a result common duties have been agreed on for 1 213 items, amounting to 95 per cent of the total tariff. The common duties on about half these items are already being applied in four of the countries. There remain 63 tariff items for which standard duties have not yet been agreed on.

The starting point of the equalization process consisted of five separate tariff systems, with marked differences for the same products as regards the rate of duty and even the tariff structure and procedures. Broadly speaking, these tariffs were essentially of a fiscal nature. In this equalization process the Central American Governments sought to achieve, in conjunction with uniform duties on imports from third countries, a tariff that would promote development and embody a selective policy aimed at changing the composition of imports and facilitating import substitution in the context of an expanding foreign trade.

The provisional results of the studies being undertaken by the ECLA secretariat for the full evaluation and analysis of the uniform tariff and of Central American tariff policy already make possible conclusions as to the nature of the equalized tariff. The ECLA study covered all the uniform duties for tariff items representing imports amounting to 372 million dollars in 1960. Under the equalized tariff the average rate of duty is 48 per cent, or only 6 per cent more than the average for the five national tariffs that existed before. The structure of the new tariff, on the other hand, involves important changes in relations to groups of products.

The percentage of value represented by the average duty is 82.5 per cent for the consumer goods group, 34.4 per cent for raw materials and intermediate goods, 32.2 per cent for building materials, and 13 per cent for capital goods. These first results indicate that, broadly speaking the tariff constructed is in line with the development criteria that were laid down by the Committee, and are suitable to present conditions in Central America.

The structural change can be realized by comparison with the average incidence for the same groups of products that prevailed in Central America as a whole before equalization. However, full appreciation of the significance of this change will only be possible when the analysis of the standard tariff is applied at the level of individual products and has covered all products. Nevertheless, the average incidence in Central America before equalization was as follows: consumer goods 64 per cent, raw materials and intermediate goods 30 per cent, building materials 26 per cent and capital goods 12 per cent.

(a) *Items awaiting equalization*

The 63 items for which uniform duties have not yet been agreed on represent 5 per cent of the total tariff items.⁴ Despite their small number, the items that remain

⁴ Of these items, about 33 per cent are capital goods, mainly for transport activities, and 28 per cent are fuels and lubricants.

to be equalized are of great significance in relation to the total value of Central American imports from the rest of the world, and as a source of revenue. External purchases of goods for which uniform duties have not yet been established represent about 30 per cent of total imports and 10 per cent of imports from within the region. Thus these are products that, because of the volume of demand and because they are not yet produced in quantity, constitute a heavy foreign trade burden. As regards their revenue significance, provisional data for 1960 indicate that the customs duties paid on imports of these items represent between 27 and 43 per cent, according to the country, of total customs revenue.⁵

During the process of working out the common tariff repeated efforts have been made to agree on the equalization of the charges on most of the 63 items that are still pending. These efforts have failed for a number of reasons. The great revenue significance of some of these items is perhaps the main reason that has made it difficult to achieve the tariff equalization in question. Thus far it has not been made sufficiently clear what would be the effect of equalization on public revenue, and for products essential to economic activity it has not been determined whether, in conjunction with a protective tariff, other measures should be taken to ensure that Central America's requirements will be fully met as regards quality, quantity and price.

At the request of the Governments the ECLA secretariat has carried out detailed studies on what would be the effects of different tariff rates on consumer prices, regional supplies and public revenue from customs duties. These studies cover a relatively small number of the products that are still pending. For other products additional studies are required, because of their importance and the complexity of the problems involved in tariff equalization for these items.

For the work of equalization that still has to be done, the first results of the application of the standard charges already adopted can be taken into account. This may lead to changes in some of the criteria that have been followed hitherto. For example, there has been a tendency as a general principle to free imports of capital goods from all duty, or to set a maximum rate of 15 per cent. Where a trend can be foreseen towards closer economic links with other countries, through special arrangements, it may be advisable to re-examine these and other principles with the aim of strengthening the economic unity of Central America.

If it proves necessary to introduce such a change in policy, the sector that still remains to be equalized provides an opportunity of doing so. Although as regards non-durable consumer goods, building materials, and capital goods for agriculture and industry almost all products have been equalized, much remains to be done, in terms of value, in equalizing durable consumer goods (67 per cent), fuels and lubricants (100 per cent), and raw materials and intermediate goods (26 per cent).

(b) *Flexibility of the tariff*

The standard tariff, conceived and formulated as an

The remaining 40 per cent are equally divided between the manufacturing and agricultural sectors, and include raw materials, intermediate goods, containers and finished products.

⁵ The percentage for each country is as follows: Guatemala 43, El Salvador 41, Honduras 38, Costa Rica 28 and Nicaragua 27. The calculation was based on theoretical revenue for Honduras, and on actual revenue for the other countries.

instrument of development, must respond to the changing needs characteristic of all processes involving growth, especially at a rapid rate. But at the same time there must be regard for the need for a relatively long period to enable the policy recently adopted to be applied and to produce the desired results. Thus one of the main requisites for economic integration at the present stage of the programme is the stability of the tariff.

The procedure for renegotiating the standard duties and charges has been laid down in the Central American Agreement on the Equalization of Import Duties and Charges, article XII of which stipulates that renegotiation shall be at the request of any one of the Contracting Parties, and through the Executive Council of the General Treaty. It further stipulates that the renegotiation shall affect only those goods in respect of which it is applied for, that decisions shall be adopted by the unanimous vote of the States members, and that in any event, every change shall maintain the uniformity of the tariff.

The procedures and methods laid down have been made flexible so that the common tariff will make it possible, from a technical standpoint, to meet future requirements, while at the same time the tariff's basic stability is maintained. The timely application of the Agreement on this subject, and the efficient functioning of the agencies of the General Treaty, would make for a satisfactory solution of the problems that arise.

In any case, any changes that are gradually introduced in the already agreed levels of uniform duties will constitute attempts to improve the structure of the common tariff so that this instrument can help to establish Central American trade with the rest of the world on the most desirable lines, and can be increasingly instrumental in ensuring the balanced development of the region's productive activity.

3. CENTRAL AMERICAN CUSTOMS CODE

For economic integration there is a standard tariff nomenclature for imports and exports, and a common tariff in which most of the items have already been equalized. It remains to draft and adopt standard tariff legislation that will ensure the proper application of the common tariff, and to unify the customs legislation of the five countries. Tariff legislation will have to be embodied in an agreement that, in accordance with article XX of the protocol on tariff equalization signed at San José, must be signed by the Governments no later than one year from the date of entry into force of the said instrument. With respect to the customs legislation, there is a draft standard code prepared by the Working Group of the Trade Sub-Committee which met in Guatemala in 1961. This was prepared in accordance with resolutions 18 (AC/17) and 22 (CCE) of the Economic Co-operation Committee. The drafting took account of the work done between 1954 and 1957 by United Nations technical assistance experts.

The draft code is of a general nature, and includes a provision that it will be supplemented by a body of regulations on specific points. The text provides for common customs arrangements, uniform organization of the national customs offices, and ways and means of co-ordinating them at the regional level.

The first point covers common definitions, terminology, time-limits and procedures in relation to the process of clearing goods through the customs, and in general to all the activity of the customs office. The second covers the

concept of a Central American customs service composed of the national customs services, whose functions and form of organization are established on a uniform basis for all the countries. The third point covers procedures for co-ordination of the customs services to ensure the maximum of uniformity in applying the existing provisions; it is laid down that if any questions of classification and so forth arise at the national customs level that affect, or might affect, the common market, they must be dealt with on a regional basis.

The establishment of free zones and free ports is to be governed by the provisions of a special Central American agreement on this subject.

The draft customs code in some respects looks ahead towards arrangements that imply the existence of a Central American customs union. This applies, for example, to the definition of the customs frontiers and to the movement of goods from third countries within Central American territory, and also to the rules governing coastal traffic.

A transitional article establishes the national arrangements that are to apply during the interim period with respect to all these cases.

At its fourth special session, held at Tegucigalpa, Honduras, in November 1962, the Committee requested that the study of the draft code at the technical level should be completed by means of a second meeting of customs officials and experts, due to be held during the first quarter of this year. The Committee also decided at this session to consider the revised draft code at a special session in March 1963.

The main point to be decided, as basic guidance for the studies to be made at the technical level, is the scope of the code, that is, whether it is to be conceived merely as an instrument of the common market, or as an instrument that initially will serve the common market, but contains from the outset the additional provisions that will enable it to be applied when the customs union is established.

The draft prepared for the meeting of customs officials in August 1961 was submitted to the Economic Co-operation Committee at its eighth session as a background document. In its present form it can serve as an instrument for unifying the system of customs operations at the regional level, establishing a close co-ordination between the customs services, and at the same time providing a body of uniform provisions of a technical nature on the process of customs clearance.

4. ECONOMIC RELATIONS BETWEEN CENTRAL AMERICA AND OTHER COUNTRIES OR GROUPS OF COUNTRIES

Both the Economic Co-operation Committee and its ancillary technical agencies have intimated that they would welcome a series of studies to determine:

- (a) The repercussions on the economic integration of Central America that may possibly be implicit in the multilateral economic co-operation movements currently under way in other parts of the world; and
- (b) Prospects, objectives and instruments for a common Central American trade policy, and ways and means of promoting its formulation and implementation.⁶

⁶ See *Informe de la Duodécima Reunión del Subcomité de Comercio Centroamericano* (E/CN.12/CCE/SC.1/81/Rev.1), and *Informe de la Tercera Reunión Extraordinaria del Comité de Cooperación Económica* (E/CN.12/CCE/258/Rev.1).

In the course of its third special session, the Economic Co-operation Committee decided to study at an early date "trade relations between Mexico and Central America and, in general, between Central America and the Latin American Free-Trade Association". Similarly, the Central American Economic Council (established under the terms of the General Treaty on Central American Economic Integration), at its first session, held at Managua (Nicaragua) in August 1962, requested that steps be taken to carry out the studies needed for the purposes of considering a Central American trade policy *vis-à-vis* the rest of the world.

Furthermore, the States signatories of the integration treaties have pledged themselves to support one another in the maintenance of a common position with respect to the formulation of new trade agreements.⁷

Pursuant to the above-mentioned recommendations, and with the aim of furnishing the Economic Co-operation Committee with preliminary background material on the basis of which to project and systematize its work in this field, the secretariat, in the present note, attempts to give an initial idea of some of the problems associated with the determination of a common Central American economic and trade policy *vis-à-vis* the rest of the world.

Some of the principal foreign trade statistics for Central America are given in document CCE/VIII/DT.2, together with interesting supplementary data on trade balances, terms of trade and purchasing power of exports as from 1950.

Central America's purchases abroad doubled during the fifties. The value of imports rose from 240 million dollars in 1950 to 515 million in 1960. In 1950, 70 per cent of the area's total imports came from the United States, which is still its leading import and export market. Nevertheless, the relative importance of this market steadily declined, until in 1960 it absorbed approximately 50 per cent. Central America's import trade has shifted towards the countries which now form the European Common Market. In 1950 about 15 million dollars' worth of goods were obtained from these sources, whereas today such purchases amount to some 100 million dollars, or 20 per cent of total imports. The relative importance of purchases from Japan climbed from 1 per cent in 1950 to 6 per cent in 1960. The total value of imports from the members of the Latin American Free-Trade Association (ALALC) did not vary during the decade under consideration; these account for only 2 per cent of total imports.⁸

Central American exports have followed a similar course. Between 1950 and 1960 they increased from 250 to 440 million dollars. The share of the United States dropped from 80 per cent to 48 per cent. The European Common Market countries absorbed 7 per cent of exports in 1950, and about 30 per cent from 1957 onwards. Japan's purchases in 1960 represented 6 per cent of Central America's total exports, whereas during the early years of the preceding decade the corresponding proportion had been barely 1 per cent. The relative importance of the purchases effected by the ALALC countries at no time exceeded 1 per cent.⁹

Since 1955 Central America has registered persistent trade deficits, which in 1960 amounted to 70 million dollars for the five Central American countries in the aggregate. The only transactions showing favourable balances were those conducted with European Common Market countries, Japan and Canada, although in this last case again the balance was negative in 1959 and 1960.

The decline observable in the external sector of the Central American economies simultaneously reflects the downward trend in the prices of the staple export commodities and similarly marked reduction in the rate of expansion of its export volumes. The causes of these phenomena are such that a substantial improvement in the situation as regards exports of traditional commodities can hardly be expected in the immediate future. The terms of trade have also deteriorated. Whereas the prices of the commodities imported by Central America remained fairly stable in 1954-60, the average price of its exports fell by 31 per cent during the same period.

From the foregoing brief résumé of the facts, it can be seen that the improvement of the terms of trade and the prospects of a satisfactory rate of expansion of Central America's total exports will depend not so much upon foreseeable changes in the markets for traditional exports as upon a policy actively directed to the achievement of these ends. Among the possibilities to be studied are those relating to the opening of additional markets in which commodities produced in Central America are in short supply, and which at the same time may be in a position to supply the area with some of the goods that it will not be able to manufacture on the basis of its own market for a comparatively long time.

The need to establish a common Central American foreign trade policy is linked to the key role the external sector of the economies of the various countries will continue to play in the future. As already pointed out, the relative independence which has recently characterized the growth of Central American trade is in the main a temporary phenomenon.

Furthermore, pursuant to provisions in the General and Multilateral Treaties, the establishment of the Central American common market involved the disappearance of several of the agreements which had previously existed and which had governed the trade relations of the different countries with the rest of the world. Hence arises the need and the occasion to formulate, at the Central American regional level, a unified policy in respect of external economic relations.

As one of the objectives of a common policy, additional to the opening-up of new export markets, the Governments have endeavoured to facilitate the imports required for the development of the manufacturing sector. This has been reflected in some of the criteria applied in relation to tariff equalization. As this process has advanced, attention has gradually been drawn to the necessity of incorporating in the standard tariff certain elements which may later serve as the cornerstone for a regional policy designed to multiply and strengthen economic ties.

For the purposes of the possible future adoption of a common foreign trade policy, a Central American negotiation unit already exists in the shape of the standard tariff, although there are other aspects of trade policy which have not yet been co-ordinated in Central America. In this connexion, it would be worth while to consider what implications for such a policy might derive from the existence of import quotas or embargoes established at the

⁷ See Multilateral Treaty on Free Trade and Central American Economic Integration, article XIV; General Treaty on Central American Economic Integration, articles XXV and XXVIII; and Central American Agreement on the Equalization of Import Duties and Charges, article VII.

⁸ See CCE/VIII/DT.2, table 1.

⁹ See again CCE/VIII/DT.2, table 2.

national level, and systems of exchange controls or restrictions on the use of foreign exchange.

This further stage of co-ordination of certain trade policy instruments once left behind — should it prove needful — stronger ties than already exist should be established with specific countries or groups of countries within the framework of agreements which need not necessarily be confined to trade objectives exclusively. Closer ties presuppose the existence of economic complementarity in relation to the countries with they are established. Potential complementarity of this kind already exists in respect of several countries which as yet carry on very little trade with Central America. The chief reason for this limited volume of trade is not to be found in the lack of trade agreements, but in more permanent factors affecting freight prospects, and in the absence of any tradition of reciprocal trade among the countries concerned. Consequently, every step in the progressive forging of increased economic links with countries of this type should be accompanied by the establishment of such additional relations in the fields of capital investment and transfer of techniques as may be needed to promote the growth of Central America's export supply.

As regards the countries or groups of countries with which broader economic relations might be sought, there are various possibilities. One of these is represented by the Latin American Free-Trade Association, and has been suggested for study by the Economic Co-operation committee and discussed by the Latin American countries at the ninth session of ECLA and other meetings. The secretariat of the Committee, at the request of the Governments, offers some information on this point in the present note.

In relation to a possible rapprochement between Central America and ALALC or any other group of countries, there is a problem of timing. The common market is too recently established for its effects to have been fully demonstrated as yet. It would therefore seem desirable that before the conclusion of economic agreements which would throw it open to goods produced by other countries, a sufficient interval should elapse for adequate trial of the opportunities afforded by the market to the area's own industrial development.

Again, belated entry into an economic group comprising markets which even at the national level are more thriving than that of Central America might entail unduly abrupt economic adjustments. Thus, in the specific case of ALALC, when a country joins the Free-Trade Area, it is granted all the concessions which the members have previously accorded one another, but, as a general rule, it undertakes to grant compensatory concessions in return for those it receives through negotiation and those extended to it by virtue of the most-favoured-nation clause. This suggests the need for exercising the greatest care in timing the establishment of any additional economic tie, either with ALALC or with other economic blocs.

The way to link up with ALALC is by accession to the Montevideo Treaty. The Treaty raises no barrier to the establishment of bilateral relations with one or more members of the Area. Under the terms of the instrument in question, accession must be unreserved and would imply acceptance of commitments deriving from the whole juridical pattern of ALALC. In the case of individual arrangements, the concessions granted by a member country to third parties would be extended, by virtue of the most-favoured-nation clause, to the other members of the Association.

As regards the manner of accession, the only suitable procedure for Central America would be to join the Association as one economic unit, not by means of five separate acts of accession, even if the terms of these were all exactly the same. During the eighth session of ECLA, the Latin American Governments regarded the Central American countries as a single unit when discussing the establishment of a Latin American common market.

There are several points that still remain to be elucidated. Within the integration treaties, no appropriate mechanisms are established for the conduct of negotiations involving commitments for all five countries as a whole. Nor are there any clauses in the Montevideo Treaty which make provision for the accession of groups of countries.

The characteristic features of the Montevideo Treaty include a set of measures designed to encourage the economic growth of countries at a relatively less advanced stage of economic development. Under this special régime, one or several contracting parties may grant another less-developed country exclusive concessions inapplicable to the rest. Similarly, the relatively less-developed country is authorized to implement its trade liberalization programme at a slower rate.

In such circumstances, it might be possible to secure advantages in specific ALALC markets which the latter would not extend to the Area, where, in consequence, important commodities might find a sale. In addition to these benefits, the relevant chapter of the Treaty commits the contracting parties, up to a point, to facilitate financial and technical assistance to less-developed members.

With reference to the commitments that Central America would assume in acceding to ALALC, the Montevideo Treaty, since it makes no provision for the accession of groups of countries, also fails to define whether the minimum annual tariff reduction of 8 per cent which members are obliged to grant would be calculated for each individual country or would be computed on the basis of Central America's total exports.

The foregoing considerations relate primarily to the patterns and methods of possible accession in the future. Other problems of more vital significance call for analysis. Among them should be mentioned the fact that the liberalization programme and any steps which the ALALC countries may progressively decide to take towards the integration of their economies may have repercussions on their economic policy, whereby, in turn, their foreign trade policy may be affected.

Another point to be considered is whether Central America's accession to ALALC would restrict its freedom to establish a trade policy in relation to other countries or groups of countries. In this connexion, the Montevideo Treaty does not prohibit its signatories from granting third countries tariff preferences or advantages, provided that such advantages are extended to the Area.

The situations outlined call for detailed studies of the impact which the expansion of Central America's relations with specific areas or countries might have upon its integration; but at the same time, the problems adversely affecting its external sector need to be tackled by means of a common trade policy. An initial step in this direction might take the form of closer contact and a better understanding between the organs of the General Treaty on Central American Economic Integration and the Montevideo Treaty, as well as the establishment of suitable procedures for the analysis of problems, especially with

respect to relations with the outside world, that may concern the States members of both Associations.

5. INDUSTRIAL INTEGRATION

(a) *Evolution of the manufacturing sector*

During the last two decades conditions have been relatively favourable to the development of manufacturing industry. The effect of the import restrictions imposed in 1940-45 was later reinforced by that of the bilateral free-trade treaties and, subsequently, that of the agreements establishing the common market. Thus, the rate of growth of the manufacturing product between 1950 and 1960 was faster than that of the rest of the economy. Nevertheless, the ratio between industrial production and the total product remained virtually unchanged, amounting to 12 per cent in 1960. This state of affairs is attributable to the incipience of the industrialization process, and is the first sign that so far there has been no steady drive behind the process in question. Even in more recent years (1961-62), with the common market already in operation, the increase in industrial production has been relatively slight.

If the countries are taken as a whole, as early as 1950 over 90 per cent of total consumption of some staple manufactures — for example, food and beverages — was satisfied with domestic production, and there was no longer any scope for import substitution. This fact, in conjunction with the limitations of national markets during part of the period, explains why industrial development had to be based on natural growth where industries of this type were concerned, and on import substitution in respect of other lines of production for which Central American demand is still largely satisfied with imports from outside the area.

The expansion of the manufacturing sector observable during the fifties was not accompanied by any very substantial changes in the structure of production. Traditional manufactures, which in 1950 represented 80 per cent of the total product of the sector, still absorbed 77 per cent in 1960. This in turn has a bearing on the further circumstance that no significant progress was made in that period in the over-all import substitution process. The proportion of the total supply of manufactured goods represented by domestic production remained the same — about 63 per cent. Yet as regards import substitution in respect of non-traditional consumer manufacturers, Central American industry achieved considerable advances. Consequently, the stability of the over-all import coefficient is attributable rather to the dynamic rate of growth of demand for capital goods which had to be purchased abroad than to the non-existence of a substitution process. Although demand for goods of this type will have to continue to depend on imports for its satisfaction, it is in respect of some of these activities that the Central American common market offers the greatest scope for the integrated development of the industrial sector.

(b) *Industrial integration activities*

Under the economic integration programme, the Committee's action in the industrial field has been intensified in recent years in three main directions. In the institutional sector, the Central American Research Institute for Industry (ICAITI) and the Central American Bank for Economic Integration were established. Furthermore, in

1956 the Committee felt it necessary to secure the more sustained participation of private enterprise in integration programmes, especially with respect to the industrial sector, and with this end in view created a Central American Industrial Initiatives Commission, composed of representatives both of the Government and of private enterprise. Subsequently, in 1959, and likewise with the aim of drawing the private sectors into the integration programme, a first meeting of Central American investors was held at San Salvador (El Salvador), on which occasion the various instruments of the programme were considered and discussed and some of the main industrial development problems were indicated. More recently, the Central American Federation of Industrial Chambers and Associations (CE-CAICA) was established, and in 1962 had already begun to examine some of the problems of industrial integration.

In a different direction, since 1957 the Committee has been studying, through the Technical Assistance services of the United Nations, the possibilities for specialized production of textiles. As a result, a preliminary speculation programme for the cotton textile industry is on the way to completion. This programme is on a regional scale and is being prepared in close collaboration with industrialists in this branch of activity and experts from the secretariat of the General Treaty.

Lastly, as an additional dimension of the programme in relation to the manufacturing sector, the Economic Co-operation Committee, at its fifth session in 1958, recommended to the Governments for their signature the Agreement on the Régime for Central American Integration Industries, which was duly signed. This Agreement was adopted in its entirety in Chapter VI of the General Treaty, which provides that within a specified period from the date of entry into force of the instrument in question the first protocols shall be signed by the Governments. In compliance with the Committee's recommendations, the ECLA secretariat has recently carried out further studies on additional industrial integration possibilities, covering mainly the manufacture of intermediate and production goods. These analyses include a preliminary evaluation of the economic viability of certain branches of industry whose installation would be a complete innovation in Central America, together with a provisional estimate of the cost of the investment required and of the repercussions of the establishment of these industries on the Central American economies.

On the basis of the aforementioned studies, and pursuant to resolution 84 (CCE) of the Economic Co-operation Committee, a meeting of an *ad hoc* working group on industrial development was held at Managua (Nicaragua) in December 1961, to consider projects presented by Governments as eligible for inclusion in the Régime for Integration Industries. The group examined these projects and drafted the provisional text of a protocol incorporating several of the undertakings in question. At a later date, the Central American Research Institute for Industry issued the necessary technical pronouncements, as stipulated in Article IX of the Agreement on the Régime, concerning the classification as integration industries of three projects which had been considered at the Managua meeting and afterwards formally submitted to ICAITI through the secretariat of the Treaty. These pronouncements are based upon minimum capacity requisites and others that are indispensable if a specific activity is to be classified as an integration industry, with due regard to such determinants as efficiency and

costs. On the basis of the Institute's decisions and the reports submitted by the secretariat of the Treaty, the Executive Council, at its second session, formulated the draft protocol appearing as an annex to the document presented to the eighth session of the Committee, and recommended it to the Governments for signature.

As part of a co-ordinated over-all approach to Central America's industrial development problems, the Committee deemed it necessary (resolution 50 (CCE)) to standardize existing legislation on tax exemptions for the establishment or expansion of industries, in order to eliminate discrepancies offering an inducement to invest or to select a particular site, such standardization to cover both the amount of the exemptions and the criteria applied in granting them.

At the request of the Committee, an expert from the Bureau of Technical Assistance Operations prepared a report on the subject. On the basis of this report and under the terms of resolution 85 (CEE) of the Committee, a working group analysed the problem, and, in the course of three sessions,¹⁰ prepared a draft Central American Agreement on tax incentives to industrial development. When the Economic Co-operation Committee had taken cognizance of this draft at its third extraordinary session, held at San José (Costa Rica), and had given the text its final form, the Agreement was signed by the Governments on the same occasion.

The Agreement makes uniform provision for classification of industries, amounts of exemptions and legal administration procedures, and stipulates that the granting of tax incentives shall be established on a completely regional basis within a maximum period of seven years from the date of the Agreement's entry into force. The greatest benefits accruing from the uniform legislation are conceded to the industries producing capital goods and raw materials, considerations relating to labour inputs and the relative importance of inputs from Central American sources being also taken into account. With the application of the instrument in question, uniformity will have been achieved in this significant respect, and the system of incentives to industrial investment will be improved.

The Agreement relates only to manufacturing industry proper. With regard to assembly work, it establishes a commitment to the effect that, within a period of not more than one year, an additional protocol shall be signed, which shall institute the system of tax incentives applicable to such activities, and shall comprise, *inter alia*, provisions relating to the trade régime to which assembly goods will be subject in the Central American common market. It is likewise stipulated that tax incentives applicable to enterprises manufacturing pharmaceutical (including medical) products shall be governed by a special protocol. In this last connexion, the Ministers of Economy, who form the Board of Directors of ICAITI, have requested the Institute to carry out the necessary technical studies. These two protocols have still to be drafted.

To ensure the satisfactory application of the Agreement, the contracting parties will adopt rules of procedure within a period not exceeding thirty days from the date of its entry into force. These rules of procedure will be drawn up by the Executive Council of the Treaty.

¹⁰ Held at Guatemala City (Guatemala), from 17 to 28 July 1961; Guatemala City (Guatemala), from 15 to 22 November 1961; Mexico City (Mexico), from 26 March to 3 April 1962.

(c) *Future requirements and measures*

The foregoing measures reflect the long-term view adopted in the Committee's studies on industrial development. From this same long-term standpoint, the development of the manufacturing sector will call for a very substantial volume of new investment. With the idea of approximately estimating the amount that will be required, the ECLA secretariat has made a preliminary examination of this problem. On the assumption that during the next ten years *per capita* income will increase at an average annual rate of 2.5 per cent, demand for manufactured goods may be expected to rise from 1,328 million dollars in 1960 to 2,738 million in 1970. Given the prospects and projections for the capacity to import, Central America's own production would have to increase from 848 to 1 828 million dollars in order to satisfy that part of demand which could not be covered with imports.

To obtain this additional output the capacity of manufacturing industry would have to be expanded at an estimated investment cost of 950 million dollars at 1960 prices. In this calculation the conclusions previously reached in a preliminary study, prepared on the occasion of the establishment of the Central American Bank for Economic Integration, are modified by the incorporation of the figures for Costa Rica, which at that time were not included.

Investment on such a scale implies the determination of specific industrial development possibilities, better knowledge of existing natural resources, and the gradual training of skilled labour and technicians at the intermediate professional levels, as well as other elements which may directly influence the productivity of the new investment. Hitherto no attempt has been made to carry out a study of industrial development resources and possibilities in Central America which will pave the way for an over-all statement of the problem and, at the same time, for practical analysis of the various elements to be brought into play in order to expedite the development of the industrial sector. A project of this type would involve both broad questions of economic analysis and purely technical issues. Current and future Central American demand for industrial products might be determined by types and classes of goods, and available resources quantitatively assessed in relation to this demand, while at the same time the viability of those industries of regional scope whose economic basis of operation can apparently be found in the common market might be evaluated.

With respect to human resources, information would have to be obtained on the present composition of the labour force, its level of qualifications and skills, and the existing training institutions, all in the light of future increases in skilled labour requirements. The Economic Co-operation Committee has included in its programme for 1963 a study of the regional labour force which will be undertaken by experts from the United Nations Bureau of Technical Assistance Operations (BTAO) and from the International Labour Organisation. This study might serve as a basis for more detailed research, in the course of which problems relating to the training of skilled labour would be analysed solely within the framework of industrial projections and in relation to specific branches of industry.

Not enough is known of Central America's resources at present. Information of this type would be of basic

importance for the determination of many of the future industrialization possibilities. A complete study of such resources generally takes a very long time, and perhaps its findings could not be obtained soon enough for the purposes of the more immediate investment decisions. Consequently, under the auspices of the Committee and with the co-operation of ICAITI, the scope of the research might be confined at first to the mineral resources used as raw materials by those industries whose economic viability in the Central American region had been established.

With a view to the more efficient utilization and the development of agricultural raw materials for industrial processing, activities supplementary to those already undertaken under the integration programme might also be carried out.

At present many goods manufactured from agricultural raw materials are still imported. A thorough analysis of this problem would involve detailed studies of a technical nature in so far as soil surveys and other equally specialized aspects of the subject were concerned. On the basis of these surveys, consumption and total imports of goods manufactured from agricultural raw materials could be compared with the possibilities of producing such goods in Central America. This comparison might constitute the point of departure for an analysis of the development prospects of a considerable number of manufacturing industries.

Central American industry uses a large proportion of the agricultural raw material available in the area. Nevertheless, imports of processed foodstuffs amounted to almost 40 million dollars in 1960, and the value of textile imports in that same year was 50 million dollars. These amounts, plus the figures for other manufactures of agricultural origin, give a sum total of 149 million dollars' worth of imports in 1960.

With a better knowledge of natural and other resources, the actual formulation of specific industrial projects could be carried beyond the stage of pre-investment studies to that of complete analyses of viability. If the information in question were at the disposal of private enterprise and Central American institutions, it might be conducive to new investment. It is needed mainly in respect of industries of regional scope which constitute a support for the expansion of the whole of the manufacturing sector. The same approach might include efforts to identify possible industrial complexes formed by branches of industry whose growth prospects are overlooked when research is carried out in watertight compartments at the project level.

It would also seem needful to obtain more exact data on manufacturing production capacity and other characteristics of industry, with due regard not only to existing plant but to expansion plans and new projects. Such information is an indispensable requisite for the analysis of specialization or industrial complementarity possibilities.

In a more general context, it must also be borne in mind that the Central American common market alters or will tend to alter the pattern of the criteria governing the choice of sites for productive activities. The impact of the several factors on which this selection depends — such as the size of the plant, the labour supply, the dimensions of the market, and transport facilities — is not the same when the location of industries is projected at the regional level and when it is determined, as was the case until recently, by the limitations of national markets.

The findings of studies on all the foregoing topics would more fully acquaint the Economic Co-operation Committee with the problems of duplication of investment and under-utilization of existing capacity, besides affording it a first glimpse of the opportunities for complementarity between various sectors of industry and for increased specialization.

6. ELECTRIFICATION

The Central American Electrification Sub-Committee was set up under the terms of resolution 59 (CCE), adopted by the Committee in June 1958. It is composed of representatives of official agencies and private electricity companies, and its primary aims are the promotion of common and co-ordinated utilization of the hydro-electricity potential existing in the various countries; the establishment of standard bases for research on hydro resources; and other objectives relating to such matters as the study of the power market, the development of uniform statistics on the electricity industry and the formulation of technical norms for the operation of electricity companies and agencies in the Central American countries.

The Sub-Committee held its first session at San Salvador (El Salvador) in November 1959. Its programme of activities is directed primarily towards the study of specific possibilities for co-ordinated hydro-electric and interconnexion projects. A United Nations Technical Assistance expert has made a preliminary study of the probable repercussions of interconnexion between two of Central America's principal hydro-electric systems on the costs of investment and of the generation and distribution of power. According to the findings obtained, which must be regarded as provisional, the joint operation of the two systems would imply a reduction in investment amounting to 28 million dollars by 1970, and a substantial saving in respect of generation and distribution. The findings in question are being amplified by the mission of experts which, at the request of the Committee, began work in Central America in the course of the past year. This second phase comprises the analysis of further possibilities for the combined operation of electricity systems as between other Central American countries. The findings of this study will be presented to the Sub-Committee at its next session, which should take place in 1963.

The Sub-Committee's work programme also includes research on hydro-electric resources and inter-Central American training for research of this type, as well as the preparation of an inventory of the hydrological stations in operation in the five Central American countries and Panama. The above-mentioned mission on electric power in Central America, in consultation and co-operation with national agencies, has carried out a study on the pertinent research activities that the countries are undertaking, and has formulated a project for the establishment of a network of hydrological stations as part of a complete programme for the survey and development of hydro resources on a regional basis.

Furthermore, in 1959 it was decided to make an analytical study of the tariff rates in force in the countries of the area. The findings of the research conducted in this connexion appear in a comparative study of electrification costs in Central America and Panama. Here the various components of the price of electric power in each individual country are established, and the reasons for the considerable disparities observable are analysed.

Pursuant to recommendations of the Sub-Committee, a project for a Central American standard accounting system for the electric power industry has been drafted.

The report of the first session of the Central American Electrification Sub-Committee (E/CN.12/CCE/207), with the appended resolutions, has been submitted to the Committee.

7. TRANSPORT

(a) *Present status*

When the integration programme was launched in 1951-52, the inter-Central American transport situation was such as to call for substantial improvement, through the establishment of a system which would efficaciously serve the region as a whole. The primary purpose of the systems then existing was to link up the areas where agricultural exports were produced, and the most important population centres in the interior of each country, with its ports and sea routes. Even so, there were investment and operational problems that were difficult to solve.

The signs of reform and of a new approach which began to be apparent during the fifties were essentially attributable to national efforts to expand internal road networks. In 1946, Central America's all-weather roads covered about 7,900 kilometres. During the next few years, road-building increased at an annual rate of 3.7 per cent, with the result that by 1952 the total extension was 9 900 kilometres. In 1961 such highways represented a total length of 20 700 kilometres, the annual rate of growth having risen during the intervening period to 8.5 per cent.

The development of motor vehicle transport has been considerable. Between 1952 and the present time the number of vehicles in circulation has doubled, and more than two-thirds of them are passenger transport and freight vehicles. It is estimated that in 1961 total freight movements amounted to almost 1 000 million ton/kilometres.

Railway, inland waterway and coastal transport have lagged behind, and the development of the corresponding networks, equipment and operations has remained stationary. The railways have not enlarged their networks, nor have they renewed their equipment for over ten years. Even so, they convey a considerable volume of freight. In some countries they carry between 60 and 80 per cent of total exports and imports transported by sea.

(b) *Central American road plan*

The Economic Co-operation Committee initiated its activities in the field of transport with its resolution 4 (AC.17), adopted in 1952, sponsoring an integrated study of the transport system in Central America. Later, it established the Transport Sub-Committee to undertake this and other studies.

Pursuant to the aforesaid resolution, a mission appointed by ECLA, Technical Assistance Administration (now BTAO) and other United Nations agencies carried out the over-all study requested and prepared a preliminary outline for a regional highway system. The study was considered and noted by the Committee in 1953.¹¹ Subsequently, in resolution 92 (CCE), the Committee recommended the formulation of a complete programme of activities geared to the establishment of the Central American road plan.

¹¹ See *Transportation in Central America* (E/CN.12/356;ST/TAA/Ser.C/8), published in Spanish only under the title *El Transporte en el Istmo Centroamericano*, United Nations Publication, Sales No.: 1953.VIII.2, September 1953.

In 1961 a Technical Assistance expert prepared a study on the progress of the Central American road network and the probable cost of its completion.¹² A working group formed by the secretariat of the Treaty, the ECLA secretariat and the Central American Bank for Economic Integration was set up in 1962 to proceed with the formulation of the draft plan. The results will be submitted to the Transport Sub-Committee at its next session, which is to be held in 1963. The report of the Technical Assistance expert on the Central American road network has been presented to the Committee.

Broadly speaking, the undertakings of regional interest projected in the 1952 study comprised about 3 930 kilometres of new highway construction or road improvement, at an estimated cost of 102 million dollars. These operations would represent 95 per cent of the total included in the mission's recommendations, which amounted to 4 142 kilometres. It was also recommended that the projects concerned should be carried out within a period of seven years, concurrently with other programmes at the national level to a value of 88 million dollars. Subsequently, more routes were included and the extent of the network increased to a total of 5 164 kilometres. So far, about 47 per cent has been paved (2 443 kilometres). Second-class roads, which can also be used in all weathers, represent a total length of 2 087 kilometres. The aggregate length of first and second-class roads is thus 4 530 kilometres, i.e., 87 per cent of the total. Most of the remaining 13 per cent is constituted by dry-weather roads. It may be noted, however, that considerable stretches — estimated at 30 per cent of the all-weather roads — urgently need reconstruction or improvement. Furthermore, supplementary works are required, including permanent bridges.

The system of highways of regional importance links up the most densely-populated areas, the centres of industry, servicios and trade, and the principal farming areas situated along the Pacific belt, but at a much heavier investment cost than was estimated in 1952. For future undertakings a cost of about 88 000 dollars per kilometre is calculated.

In the central areas all the highways classified as of regional importance have been completed; they are all-weather roads and 90 per cent of them are paved. In contrast, nearly one-third of the roads in frontier districts cannot be used in all weathers. This prevents any expansion of the area of influence of longitudinal highways and deprives the system of its regional scope.

(c) *Maritime transport and ports*

In resolutions 21 (AC.17) and 92 (CCE), of 1953 and 1959, the Committee decided that the problems of port and maritime transport development should be considered within the integration programme. The studies carried out indicate the need for the highest priority to be assigned to the physical reconstruction of ports, the modernization of equipment, port facilities, transport and communications, and port administration. Another recommendation is that up-to-date standard port and maritime legislation and regulations be established and the training of administrative personnel promoted.

In resolution 19 (CCE), the Committee urged that maritime legislation be brought up to date. Accordingly, the *Proyecto de Código Marítimo Uniforme para los Países*

¹² See *Informe Preliminar sobre Red Vial Centroamericana* (E/CN.12/CCE/250; TAO/LAT/38).

ses *Centroamericanos* (Draft Standard Maritime Code for the Central American Countries)¹³ was prepared, together with another study, properly co-ordinated with the former, entitled *Disposiciones para la Legislación y Reglamentación Portuaria Uniforme en Centroamérica* (Provisions for Standard Port Legislation and Regulations in Central America).¹⁴ These two projects were discussed by the competent government agencies. Generally speaking, national working groups considered that it would be premature to apply a regional maritime code, since the relevant legislation is closely linked to trade codes and these in turn seem to need overhauling. As regards port legislation, some countries have taken steps to apply a good many of the draft regulations that have been formulated, but further action in this field would appear to be required.

Progress has been made in the construction of docks and other works at the chief ports, on the basis of investment which in 1956-61 amounted to approximately 18 million dollars. These projects would have to be supplemented in the future by the establishment or expansion of such technical services and material facilities as would increase port efficiency and expedite the handling of shipping.

(d) *Other matters*

If by its very nature inter-Central American trade has generated increased demand for highway facilities and motor vehicle transport, the progress of the common market towards its final form and the creation of a single customs territory seems likely to call for the adequate expansion of other means of transport. The need to remedy infrastructural deficiencies at a rapid rate has precluded thorough study of the application of more modern constructional technology; nor has it been possible to prevent duplication as between two or more means of transport. But this phase may soon come to an end, and the policy to be pursued can then be systematically defined.

The development of the motor vehicle transport industry has lagged behind the road-building programme, owing, *inter alia*, to the lack of continuity in inter-Central American traffic and to the difficulties attending the establishment of programmes relating to the replacement of vehicles and the expansion of mobile equipment inventories.

So far, it has not been possible to create at regional level an efficient, expeditious and economically satisfactory motor transport service to meet the needs of the development of regional trade. In article XXIX of the General Treaty, provision is made for the adoption of transport regulations which would eliminate some of the administrative difficulties that discourage services of this type.

Moreover, the amounts of freight carried in different directions are not evenly balanced. It has been impracticable to use specialized vehicles for particular types of goods because trade in the products concerned is intermittent. These problems help to keep costs of motor transport high, so that they are almost prohibitive in the case of goods of low economic density.

The importance of modernizing telecommunications has been touched upon in relation to the establishment of various radiocommunication services in air and maritime transport, and also as a means of expediting trade movements.¹⁵ Since 1960 the Central American Governments

have decided to grant priority to the establishment of satisfactory public telecommunication services, and have begun consultations with international financing institutions. In response to the interest displayed by the Governments, a mission from the International Bank For Reconstruction and Development (IBRD) visited Central America at the end of 1961, and in March 1962 the United Nations Special Fund decided to finance a study which would serve as a basis for the planning and design of the telecommunications network in each country, with due regard, in addition, to regional and international communication requirements. A fifteen-year basic plan is to be established, together with a detailed programme of targets for the first five years of the plan, and an estimate of its cost.

8. CO-ORDINATION OF HOUSING PROGRAMMES

The Economic Co-operation Committee has been devoting attention to housing problems since 1957. The Housing, Building and Planning Sub-Committee was established under the terms of resolution 61 (CCE), adopted by the Committee during its fifth session, in 1958. The Sub-Committee, composed of the high-ranking officials responsible for national housing institute programmes in Central America, enjoys the co-operation of the United Nations Bureau of Technical Assistance Operations (BTAO) and, more recently, the Inter-American Development Bank (IDB) and the Organization of American States (OAS).

The activities pursued to date include the determination of bases for the establishment of regional specifications in respect of building materials; a study on the natural resources of Central America that could be used in the manufacture of housing materials; an inventory of the construction materials industries already in existence in the Central American countries; a complete project for the first phase of application of a modular co-ordination system in national housing programmes; and a detailed analysis of the recent evolution and current status of these programmes. The secretariat has presented reports and documents on each of these topics.¹⁶

The final modular co-ordination project was prepared by a working group which met at San Salvador (El Salvador) in 1962. This project, together with the other studies and documents mentioned above, is to be submitted to the consideration of the Housing, Building and Planning Sub-Committee at its second session, to be held in 1963.

As regards other activities, in 1962 officials from the five Central American countries and Panama actively participated in the Latin American Seminar on Housing Statistics and Programmes which took place in Denmark.

¹³ See *Coordinación modular en la vivienda económica* (E/CN.12/CCE/SC.4/9); *Informe del grupo de trabajo sobre coordinación modular en vivienda* (San Salvador, El Salvador, 14 to 23 August 1962) (E/CN.12/CCE/SC.4/10); *Estado actual de los recursos naturales del Istmo Centroamericano y su posible aplicación en la manufactura de materiales de construcción utilizables en la vivienda* (E/CN.12/CCE/SC.4/16); *Industrias o establecimientos que fabrican materiales de construcción en el Istmo Centroamericano* (E/CN.12/CCE/SC.4/15); *Glosario de términos empleados en arquitectura y construcción en el Istmo Centroamericano* (E/CN.12/CCE/SC.4/10); *Programas de construcción de viviendas en los países del Istmo Centroamericano para 1962-63 y su relación con los materiales de construcción requeridos* (E/CN.12/CCE/SC.4/17); *Materiales de construcción requeridos para los programas de construcción de viviendas 1962-63, en los países del Istmo Centroamericano* (E/CN.12/CCE/SC.4/17/Add.1).

¹⁴ TAO/LAT/27; CCE/SC.3/01.1.

¹⁵ TAO/LAT/28 (limited distribution).

¹⁶ *Informe de la Primera Reunión de Inversionistas Centroamericanos* (E/CN.12/CCE/206), annex VI.

Furthermore, fellowships have been distributed among the five Central American countries and Panama to provide a year's training, in several European countries, for housing institute officials specializing in design and construction materials. These activities are being carried out with the co-operation of the United Nations and of various European institutions.

The analysis of housing problems in the countries under consideration reveals, in 1962-63, an expansion of the building activities of the various agencies operating in this sector. External financing amounting to approximately 45 million dollars is available for the construction of 20 000 housing units. Nevertheless, complete satisfaction of the requirements deriving from population growth is still a long way off, and if any attempt were made to cover part of the cumulative deficit the gap would be still wider. On the basis of a projection which estimates the increase in the population of Central America during the next two years at 700 000 inhabitants, new housing requirements will probably amount to about 140 000 units in that period.

Of the work outstanding, the following are the proposals which might be considered for immediate implementation. With respect to modular co-ordination, on the basis of a report by the United Nations Technical Assistance expert assigned to this programme, the meeting held at San Salvador (El Salvador) formulated the modules for co-ordination purposes and laid down the procedure for their first application on an experimental scale. To ensure the continuity of this effort, a pilot housing programme using the modular system should be carried out with the participation of national housing institutes and the Central American enterprises producing construction materials.

With a view to improving the construction of housing units and ensuring the necessary flow of supplies, attention has been drawn to the need to promote the use of hand tools and low-cost construction equipment which would help to increase productivity and improve standards of quality. An attempt would be made to introduce methods of construction which, while highly efficient, permit

maximum absorption of the labour force. In these activities specialized technicians would also take part, giving demonstrations on building sites. As an additional line of approach, promotion activities could be undertaken in respect of the installation and expansion of Central American production of tools and light basic equipment for such purposes.

To encourage the development of production of construction materials in Central America, thorough research on the region's natural resources should be conducted on selective lines. In some cases — for example, those of minerals and forest resources — suitable raw materials for the manufacture of building materials are known to exist in Central America, but no complete studies are available as a basis for programming the establishment of the corresponding branches of industry. However, the study already carried out by the United Nations Technical Assistance expert has made it possible to clarify and determine, *inter alia*, the existence of resources, such as those of volcanic origin, which could be turned to account forthwith, and which might provide some raw materials at lower costs than those currently prevailing. The aforesaid study also indicates several possibilities for trade in such raw materials among the Central American countries which might be the subject of detailed research.

A comparison between this inventory of natural resources and the inventory, also taken in Central America, of existing construction materials industries might bring to light, over the short term, additional possibilities for industrial development in this important sector of the economy.

In addition to the foregoing activities of the Sub-Committee, mention should be made of the increasing emphasis placed in the Central American countries on public investment in housing, as well as of the fact that ampler external financing facilities than formerly existed have recently been made available. Clearly, if these three elements were brought into play in Central America on the basis of co-ordinated approach at the regional level, the objectives pursued by the Governments in this field could be sooner and more efficaciously attained.

PLANNING IN FRANCE

By *François Le Guay*

1. A BRIEF ACCOUNT OF THE BACKGROUND

The purpose of this paper is to describe the planning techniques used in France and to assess the results achieved so far.¹

It was felt that the subject might be of general interest in spite of the unusual and peculiar nature of the French planning system. However, it should not be approached with the idea that the French techniques may produce formulas which can be applied just as they stand. The purpose is rather to try to show how French planning methods were established and have developed over the past fifteen years, with due reference to the economic and social framework and administrative structures existing in France. It is not so much the adoption of the methods themselves — which might prove ineffective in another context — as the study of this process of adaptation and evolution that might be of some interest.

It therefore seems essential, before describing the methods of planning, to outline briefly the economic and social framework and the administrative structures peculiar to France and to describe, in a few words, the evolution of the methods used since they were first applied. Two additional reasons may be given:

(a) Planning in France was not accompanied by any basic transformation of the earlier economic and social system. It did of course emerge during the period of major changes following the Liberation, but the latter did not produce any disruption of the pre-war structures. Planning had to adjust to this situation and to adopt a completely empirical approach. As Mr. Pierre Massé, the present Commissioner for the Plan, has written: "In France planning practice came a long way ahead of theory."²

(b) Planning in France has now been under way for some fifteen years. The continuity of the pattern it has followed during this period has been quite remarkable in spite of the political changes which have occurred in France. However, continuity did not mean stagnation but reflected a sustained evolution which has certainly not come to an end. A brief outline of the changes which have already taken place may shed light on the reasons for a particular practice. That is why it was thought desirable to outline the situation, in space and time, of the planning methods currently applied in France.

1. A BRIEF ACCOUNT OF THE ECONOMIC AND SOCIAL BACKGROUND IN FRANCE

The present economic and social situation in France

¹ The author, who is an expert from the economic and financial research services of the Ministry of Finance of France, wrote the present paper for the course he gave on this subject in connexion with the Training Courses held at the Latin American Institute for Economic and Social Planning, in August and September 1962.

² Pierre Massé, "Méthodes françaises de planification". Lecture delivered in London in April 1961. (No. 20 in the Bibliography.)

cannot, of course, be summed up in a few words. An attempt is made below to point out some facts which may make it easier to explain how planning has developed.

(a) France emerged from the First World War with its population situation and its economy considerably weakened. It was more true of France than of many other countries that the crisis of the thirties caused the country to fall far behind both technically and economically. The hardships brought about by the war and the occupation worsened a situation which had been disturbing enough even in 1939.

(b) The Liberation aroused a very acute awareness of the backward state of affairs. The fact was appreciated in widely different quarters that it was not merely a question of repairing the damage done over the five previous years but also of improving a situation which had long been in jeopardy. Mr. Jean Monnet, the first Commissioner for Planning, expressed this in the striking phrase: "Modernization or decadence".

(c) The population growth in France since 1945 was something the like of which it had not experienced for a long time. The total population increased by some 4 million (or 10 per cent) in ten years. On the other hand, during the same period the active population remained stationary at around 19 million.

(d) The French gross national product in 1959 was about 260 000 million New Francs, or some 53 000 million US dollars at the current exchange rate, which represents approximately 1 100 dollars per capita and 2 800 dollars per active person. These figures place France on about the same level as the industrialized countries of Western Europe. (They are slightly higher than the corresponding figures for Germany and the United Kingdom.)³

(e) The French economy has so far been somewhat of a closed shop in relation to the outside world. In recent years its foreign trade has represented about 10 per cent of the gross national product. The ratio has been steadily rising as a result of the country's entry into the Common Market which has likewise had a stimulating effect on the French economy.

(f) The structure of the French economy is still not what it should be, considering the country's economic level of development. In particular, the active population employed in agriculture amounts to some 25 per cent of the total active population. This large labour force available to industry will allow present development to continue for a long time to come.

(g) The State has played an important role in the economy since the war. It has the ordinary fiscal and monetary resources at its disposal; but as a result of the nationalization policy carried out in 1945 and the ac-

³ These figures are given as a rough indication of size though clearly any comparisons based on rates of exchange are unreliable.

tivity of specialized financial agencies, it is also playing a specific role in the economy. State-controlled enterprises provide about 30 per cent of domestic production, and about half the investments of all kinds that are made are State operations.

(h) France, which has long lagged behind in the field of economic theory and practice, has tried to make up for the delay. The progress achieved in the establishment and utilization of modern instruments for economic forecasting and management has provided the State with means for the conduct of its economic policy.

(i) To sum up, for the past fifteen years France has been engaged in a very rapid transformation process which affects the technical, economic and social sectors and extends even to administration. As a result, the delays and imbalances affecting some sectors (agriculture) or regions are felt all the more acutely.

2. A SHORT HISTORICAL OUTLINE OF FRENCH PLANNING

French planning came into being immediately following the Liberation, by virtue of a decree issued by the provisional Government dated 3 March 1946, establishing the Office of the Commissioner General for Planning.

The problem at that time was to set the productive apparatus in motion once again and to make up for the technical delays resulting from the war and the pre-war period of stagnation. The task of the First Plan was to stimulate and co-ordinate the reconstruction programmes by establishing an order of priorities in the use of the resources available both at home and abroad. It was therefore confined to six basic industries and made no attempt to cover the entire range of economic development. The First Plan remained in effect until 1953.

The aim of the Second Plan (1954-57) was not only to increase production but also to improve it, that is to

say, to place it in a competitive position from the standpoint of quality and price. Moreover, the advances achieved in national accounting, which provide an over-all picture of the economy, made it possible to tackle the problems of co-ordination between the different sectors. The quantitative targets of the Second Plan taken as a whole, were exceeded, but at the expense of the balance of the economy in essential areas. During the period prices rose sharply and there were serious deficits in the balance of payments.

The Third Plan (1958-61) was, for the first time, a true development plan including the objectives of monetary stability and balance of payments as well as the prospect of strong expansion. Matters were put in order in 1958 and, as a result, these objectives were more or less achieved.

From the technical standpoint, this rapid sketch shows that the evolution of planning in France was reflected by the fact that, from stage to stage, each successive plan was:

(a) More comprehensive (more economic sectors were included);

(b) More detailed (each sector studied was broken down into more sub-branches);

(c) More coherent (increasing attention was paid to economic balance and the relationship among the various sectors);

(d) More complete (problems of prices, income and financing were gradually added to the physical objectives of production).

Now that this brief historical digression has been made, no account will be taken of the first three Plans. The remainder of this paper will deal with the Fourth Plan, which covers the period 1962-65. Its preparation was completed towards the end of 1961 and it was adopted by Parliament in July 1962.

II. GENERAL COMMENTS ON FRENCH PLANNING

Before describing the organization, the technical media and the methods of preparing the French Plan, a brief indication must be given of the general approach in France to the role of planning in a developed industrial society.

This approach is based first of all on the increasing acceptance in France, since the Second World War, of the concept of economic expansion. This concept was not only observable in France, as in other Western European countries, but it was accompanied to some extent by a psychological evolution which was itself an important factor making for that expansion.

(a) In a recent report on economic growth in the fifties, OECD contended that one of the chief factors in growth is the view, generally accepted by public opinion and particularly among entrepreneurs, that a sustained increase in demand can continue over a fairly long period.

This confidence in potential demand undoubtedly exists in France. Recourse to planning stems from the idea that this demand can be effectively stimulated and co-ordinated. Of course, the market mechanism continues to play a predominant part in France, but the view is fairly generally held that a more enlightened policy is feasible in regard to the market. Enterprises, particularly those requiring investment needing several years of study and

implementation, are attempting to estimate potential development of demand by means of increasingly thorough market studies. One of the Plan's primary functions will be to provide a common and coherent general framework for these studies. It will act as a sort of over-all study of the market.

(b) The Plan not only provides a setting for the forecasts of autonomous decision-making centres. It also expresses a resolution — it reflects the long-term trend of the Government's economic policy. It does more than passively record past trends in an attempt to forecast their spontaneous movement in the future. It aims, at least in some fields, at setting up standards.

The chief example of this is the significance attached in the Fourth Plan to community investments (education, health, town planning, etc.). This significance reflects the urgency of the needs and the delay experienced in this area. It also expresses a determination to avoid the excesses of "gadget civilization" by giving priority to the satisfaction of certain community needs. As such the Plan is, to some extent, a sort of collective commitment binding the Government, Parliament and the national community as a whole. Some have even gone so far as to consider it a new type of social contract in embryo.

(c) From the very beginning, French planning has

taken as its basis the idea of persuasion and incentives of various kinds rather than rules and regulations. To this end, as many representatives of economic and social forces as possible have been associated with the preparation of the Plan, which is the outcome of a system of give-and-take between the centre and the decentralized decision-making agencies, between the public authorities and autonomous economic agents. It was in connexion with the preparation of the first Plan that the term "concerted economy", widely employed in France ever since, was first used.

(d) The French Plan is a plan based on branches of industry and not a plan on enterprises. Except for a few highly concentrated sectors where the over-all objectives are the sum of individual projects, it does not set a target for each specific enterprise, but only for fairly broad branches of industry.

III. ORGANIZATION OF PLANNING

1. THE OFFICE OF THE COMMISSIONER-GENERAL FOR THE PLAN

The Office of the Commissioner-General for the Plan is the basic planning instrument in France. Under the Commissioner-General, it is responsible for preparing the Plan to be submitted to the Government for approval, supervising its implementation and reporting on the results achieved.

The Office of the Commissioner-General for the Plan plays, first of all, a creative role. It undertakes prospecting studies which are essential for shedding light on long-term future trends. It also lays down the general frame of reference for the studies of the Modernization Commissions and synthesizes their work for insertion in the plans themselves. Since it has an over-all picture of the problems involved, it acts permanently in an advisory capacity *vis-à-vis* the Government on its long-term economic policy.

The Office of the Commissioner-General for the Plan actually also plays a most important part as a stimulus and catalyst. It is an agency for action, not an institution for study and research. It has to supervise the implementation of the plan and in doing so to see to it that the measures adopted are in fact carried out as effectively as possible by the administrative services concerned.

In order to perform these functions, the Office of the Commissioner-General for the Plan must be an administrative organ. However, it plays a very special part and has a very special type of organization within the French administrative structure. It is a small body, with a staff of only about forty at the executive level and fewer than one hundred all told. It does not directly administer any major service and can only act through the outside support it receives from the other Government departments.

The Commissioner-General for the Plan is appointed by virtue of a decree of the Council of Ministers. He has a high position in the administrative hierarchy and takes part in inter-ministerial meetings on economic questions and sometimes in those of the Council of Ministers. He is often granted hearings by parliamentary commissions and, when the Plan is put to the vote, by Parliament itself.

The staff of the Office of the Commissioner-General for

Each enterprise remains free to fit into the general target aims and the public authorities intervene only where there is a danger of imbalance on a general scale.

These main characteristics of French planning might suggest that the Plan is something ambiguous and contradictory: concerted and yet normative; a framework for freely-taken decisions and an instrument of the Government's will; fixing over-all targets while leaving a place for the market economy.

This ambiguity does in fact exist in French planning. It may be thought that it merely reflects the ambiguous nature of the economic and social system found in post-war France — equally remote from classical liberalism and from the authoritarian planning systems of the Soviet type. This apparent contradiction makes one fact clear: the French economic system does not readily lend itself to theoretical analysis of the traditional type.

the Plan, while small in number, is of high quality and drawn from the most varied sources. Some members were recruited outside the civil service, but most are civil servants; they have had administrative training (as members of the Inspectorate-General of Finance, the Audit Office or civil executive officers of Ministries) or technical training (as engineers from the Department of Mines, the Department of Civil Engineering or the Institute of Agronomy).

The staff of the Office of the Commissioner is divided into services of the horizontal or vertical type. The horizontal services include economic, financial, and regional divisions, while the vertical services are the agricultural division and various technical departments (power, transport, industry, urban facilities, etc.). Each of these units has only a very small staff. Since 1959 a productivity service has been attached to the Commissioner-General's Office. Its function is to promote any action likely to encourage development of productivity by disseminating information and publicizing new techniques.

While adopting a policy of conciliation rather than authority, relying more upon external support than on a staff of its own, the Office of the Commissioner-General for the Plan has nevertheless succeeded in making itself felt *vis-à-vis* different ministerial departments. It has done so chiefly because of the quality of the work it has promoted and guided in the preparation of the four successive Plans.

It is not so much an administrative body as a meeting place, a neutral area where representatives of the various ministerial departments agree to air their views in spite of the inflexibility of the administrative departments, and where heads of enterprises can, without undue mental reservations, discuss matters with the officials responsible for economic policy.

2. THE MODERNIZATION COMMISSIONS

The small size of its staff, deliberately decided upon at the very beginning and maintained for some fifteen years, makes it absolutely impossible for the Office of the Commissioner-General for the Plan to undertake the preparation of the four-year Plans alone. It can only do so if as many different people as possible are involved in the

preparation of the Plans. This is basically the role of the Modernization Commissions, which are a peculiar feature of French planning.

Each of these Commissions is made up of between thirty and fifty persons, all of them participating on a voluntary basis. The members are appointed by decree of the Minister of Finance (upon the proposal of the Commissioner-General for the Plan) and are selected from three major categories: civil servants from the various ministerial departments concerned, workers (represented by the four principal labour unions) and executives of enterprises and professional associations.

For the Fourth Plan twenty-four Modernization Commissions were established; they can be divided into two categories:

(a) The so-called vertical Commissions, which study the entire range of problems arising out of the development of a sector of economic and social activity; some of them are concerned with the different sectors of production (agriculture, power, manufacturing industries, etc.), and others with various sectors of administrative investment (schools and universities, health, cultural facilities, etc.).

(b) The horizontal Commissions, which are responsible for synthesizing the data supplied by the vertical Commissions for problems of a general nature. These are mainly the General Economic and Financing Commission and the Manpower Commission.

For detailed study of the questions entrusted to them, the Modernization Commissions set up working groups which concentrate on specific sectors or problems. For example, the Commission on the Manufacturing Industries has set up 60 specialized working groups to cover the 250 or so basic industries for which it is responsible. The General Economic and Financing Commission has set up a group on balances, a foreign trade group, a private financing group and a public financing group. The Manpower Commission has established groups on the balance of employment, on qualifications and on regional balance.

The total number of persons serving on the Commissions and the working groups for the Fourth Plan was about 3 100, broken down as follows:

	<i>Members</i>
Commissions	991
Working groups	2 147
Total	3 138
Breakdown: Labour unions	281
Agriculture	107
Heads of enterprises (including national enterprises, handicraft, commerce and banking)	715
Professional associations:	562
Civil servants	781
Miscellaneous (persons connected with universities, the liberal professions, experts)	692

The Modernization Commissions play an advisory role. They express an opinion, which the Commissioner-General for the Plan, and the Government, may or may not accept, but in fact their representative nature is such that their advice is often followed.

A membership strictly proportional to the groups re-

presented was not sought in setting up the Commissions. Such an attempt would not have made such sense, since the Commissions do not vote and each member is free to record his dissent in the minutes and reports. The persons appointed, moreover, are not merely representatives of the professions or departments; they act as experts and are selected on the basis of their personal ability.

One of the aims of the Modernization Commissions is to bring into the Plan all the social categories which have some say in the economic life of the country. The Plan must, as far as possible, be the expression of the general will and enjoy broad support.

Representation of employers' groups is ensured either by representatives of professional associations or by particularly qualified heads of enterprises. The existence of the Modernization Commissions for the past fifteen years has certainly led to a considerable improvement in co-operation between the public authorities and employers.

Labour union participation met with some difficulty. For the Fourth Plan, all the large central unions were invited to participate in the Commissions and working groups, and they accepted the invitation. However, the unions felt that, in general, the role they were offered was insufficient in present circumstances. The representatives of some of the labour unions made substantive reservations toward the draft Fourth Plan.

The role of the Commissions is twofold:

(a) They make available all the information at their disposal on the past activities and future prospects of their sectors. They are thus an extremely valuable source of data which do not in any way overlap with the normal statistical information media. Translated into figures, the data supplied provide the raw material for the synthesis of the Plan.

(b) They formulate recommendations on measures which, in their view, are likely to improve conditions in their sector. These proposals are either of a technical and organizational nature intended for entrepreneurs, or administrative (financing, fiscal measures, customs tariffs, price policy, etc.) intended for the public authorities.

These two types of activity of the Commissions are brought together in a report which synthesizes the reports of the working groups. Each report commits only the Commission which adopted it. It cannot be imposed either on the Commissioner-General for the Plan or on the Government.⁴

The Modernization Commissions are of a temporary nature. They are appointed in connexion with each Plan in order to take part in its preparation. The possibility of giving them greater permanence and having them meet regularly to supervise the implementation of the Plan in their respective fields is now under consideration.

3. THE PLAN AND THE NON-PROFIT SECTOR

As we have already seen, the Office of the Commissioner-General for the Plan cannot as a rule take direct action because of the limited means at its disposal. It must at all times maintain relations with the different traditional services of the non-profit sector and co-operate with them. These services existed long before the establish-

⁴ See a few examples of the reports of the Modernization Commissions (Nos. 3 to 8).

ment of the Office of the Commissioner. The latter has not replaced them and has left entirely to them specialized tasks of administrative management. On the other hand, the Office of the Commissioner-General for the Plan has had to rely on them considerably with respect to both the formulation and the implementation of the Plan. By that very fact it performs an important function by linking the Government to the non-profit sector. The Office of the Commissioner has gradually found its special niche in the French administrative structure. Its influence has been much more the result of its acknowledged competence than of the existence of regulations.

Co-operation between the Office of the Commissioner for the Plan and the rest of the non-profit sector is effected in a variety of ways. When plans are prepared, representatives of the different ministries sit on the Commissions and working groups and often act as rapporteurs.

It should be added that the structure of some central non-profit sector services has been modified to bring them into line with the Office of the Commissioner-General for the Plan. Thus research and economic co-ordination units have been set up, particularly in the Ministries of Agriculture, Industry and Public Works. These horizontal units make it possible to harmonize the action of the various vertical sections of a ministerial department.

Special mention should be made of the role of the Ministry of Finance and Economic Affairs in the area of planning. It covers both the preparation and the implementation stage of the Plans. The Minister of Finance participates in the preparation of plans in two ways:

(a) The statistical and study services (National Institute of Statistics and Economic Studies, Department of Economic and Financial Studies) are closely concerned with the preparation of Plans. Not only do they provide the required statistical data but in addition, they ensure, within the framework of national accounting, that the estimated figures given by the different Commissions are consistent.

(b) The traditional executive offices of the Ministry of Finance, particularly the treasury and budget offices, also play an important part in the preparation of plans. They have their say when the final texts are reconciled at the time of the synthesis. When the Fourth Plan was formulated, the Budget Office for the first time prepared budget estimates for the year 1965 which will serve as a guide line when the next annual budgets are prepared.

The part played in the implementation of plans by the Ministry of Finance and, more particularly, by the national accounting departments and the National Accounts and Economic Budgets Commission will be considered in detail in the chapter on the implementation of the Plan.

4. THE PLAN AND GOVERNMENT ACTION

Over the years the Office of the Commissioner for the Plan has sometimes been attached to the Ministry of Finance, on other occasions it has come under the President of the Council or the Prime Minister (the situation since the Decree of 10 May 1962). These changes in the position of the Office of the Commissioner do not in fact reflect any major upheaval. The Office of the Commissioner-General for the Plan has always enjoyed a kind of intellectual autonomy recognized by every Minister.

In any event, the Development Plan is an act of government which, at various stages of preparation and im-

plementation, is the subject of a number of legal texts binding upon the Government:

(a) A Council of State Decree orders a Plan to be prepared and entrusts its preparation to the Commissioner-General who, after prior studies and consultations, submits the broad objectives of the Plan to the Government for approval;

(b) Ministerial orders appoint the members of the Modernization Commissions, whose work the Commissioner-General must co-ordinate and synthesize;

(c) When the draft proposed by the Commissioner-General for the Plan is ready, it is submitted to the Council of Ministers, the Higher Council of the Plan and the Economic and Social Council;

(d) The parliamentary bill concerning the Plan is tabled in the National Assembly and the Senate for consideration and vote;⁵

(e) Finally, each year when the budget is voted, Parliament is informed with respect to the implementation of the Plan and checks the results.

Within the Plan itself, government action is taken, on the one hand, when the Plan itself is first drafted, in the form of directives issued by the Government to the Commissioner-General for the Plan to serve as a frame of reference for the work of the Commissions⁶ and, on the other hand, at the final stage of preparation of the Plan, in the form of reconciliation of any conflict of views between the different Commissions.

The Government's directives included a definition of the purpose of the Fourth Plan (implementation of major national tasks, improvement in the population's living conditions, full employment, priority measures to meet community needs); the decision to take the figure of 5 per cent as the annual growth rate of the gross national product, with the possibility of raising it to 5.5 per cent; guide lines for the principal sectors; the establishment of conditions for the achievement of a balance in basic areas (price stability, balanced foreign exchange, regional balance, etc.).

In short, the Plan as a whole commits the Government to a course of action, even if a particular measure may subsequently be changed. These commitments take the form of a vote by Parliament.

5. THE PLAN AND THE REPRESENTATIVE ORGANS

Preparation of the Plan depends to a large extent, as we have seen, on representative organs such as the Modernization Commissions, which are directly stimulated by the Office of the Commissioner-General for the Plan. However, other agencies are called upon for advice or consent. These are mainly the Higher Council of the Plan, the Economic and Social Council and Parliament.

(a) The Higher Council of the Plan is an advisory organ established by virtue of a Decree of 12 July 1961. It takes over, along somewhat different lines, the part played by the Planning Council under the Fourth Republic.

The new Higher Council of the Plan is presided over by the Prime Minister, and its membership includes representatives of professional associations, trade unions, regional promotion committees and the Economic and Social Council. It is kept informed of the different phases

⁵ See text of the bill concerning approval of the economic and social development plan (1).

⁶ See the text of the Government's directives (11).

of the preparation of the Plan. It draws up a report on the draft Plan proposed by the Commissioner-General for the Plan before it is submitted to the Government and considered by the Economic and Social Council. Every year it examines reports on the implementation of the Plan. It compares the results achieved with the targets set for the principal activities and the different regions and proposes to the Government such measures as are likely to ensure implementation of the Plan and, in particular, its social aims.

With respect to the Fourth Plan, the Higher Council was consulted in October 1961 and expressed its opinion on the introductory statement in which the broad outlines of the Plan were set forth.

(b) The Economic and Social Council is an advisory body, a sort of "meditation chamber" without authority to initiate legislation. With respect to the first three Plans, it was only consulted in the final stage of preparation. In the case of the Fourth Plan, the Government consulted the Investment and Planning Section of the Economic and Social Council before issuing its directives and setting the Modernization Commissions to work. This Section spent two months on the studies requested of it by the Government and unanimously adopted two reports, one by Mr. Delors on the evolution of household consumption, and the other by Mr. Charvet on the prospects of the French economy in 1965. These reports contain two main suggestions: the growth rate should be kept as close as possible to the 6 per cent considered in the preliminary studies; and priority should be given to investments designed to meet community needs (education, health, urban facilities, etc.).

(c) The bill approving the Fourth Economic and Social Development Plan was submitted to Parliament at its spring session in 1962. It was adopted by the National Assembly on 22 June and by the Senate on 23 July, and was published in the *Journal Officiel* of 7 August.

The Plan is not a standard piece of legislation. The Act concerning the Fourth Plan is a very short text to which a document of several hundred pages is attached. Parliament adopts it as a whole, without voting separately on each article. It is an unwritten law that cannot be changed by way of amendment.

During the debate, a number of members of Parliament objected to this procedure and expressed the wish that Parliament should be involved in the preparation of the Plan at a much earlier stage and should be allowed to express its views during the discussion of the preliminary alternative proposals. The Government undertook to see to this with respect to the preparation of the Fifth Plan.

IV. THE TECHNICAL INSTRUMENTS OF PLANNING

1. OVER-ALL MODEL OR SUCCESSIVE APPROXIMATIONS

From the technical standpoint, to devise a plan is to sketch for some year in the future, a picture of the economic situation which is both desirable and feasible. This assumes that the picture will include the targets set by the community and will take into account the greatest possible number of ratios reflecting the pressures on economic equilibrium.

These ratios may be of very varied types:

The regional aspect is now commanding greater attention in French planning. It is more in evidence in the Fourth Plan than in any of the earlier Plans. Based on an analysis of regional imbalances, it defines objectives and states what should be done in a policy of regional action. It places special emphasis on industrialization in areas with a manpower surplus, particularly the West of France where jobs must be made available in view of the high birth rate and a large surplus active rural population.

This regional action policy forms part of the alternative lines fraction defined in advance for the country as a whole. It crystallizes and shapes their content while conforming to the general aims of the national Plan.

In France, regional planning in fact supplements national planning. It is a geographical projection of national planning and makes it possible to visualize the consequences involved for each region. A comparison at the regional level of action undertaken by sectors is most revealing; it brings fully to light the social or human imbalances which could not be discerned by national planning undertaken on a purely sectoral basis. The Plan's decisions can thus be given this proper inflection in order to establish throughout the territory conditions conducive to harmonious economic development.

Regional planning is undertaken in a new territorial framework established in 1955 — twenty-one programme regions each consisting of a number of departments. An economic and social and development plan will be prepared for each region. These regional plans lay down long term guide-lines without setting deadlines for achievements or financing prospects. In order to fit them into the national plan, an "operational section" covering the same period as the national plan for 1962-65 will be prepared.

The Office of the Commissioner-General for the Plan has no regional branches. Hence, in preparing the operational sections it will work in close co-operation with existing agencies such as economic promotion committees on which various social groups are represented, and inter-departmental conferences attended by the prefects of the departments concerned.

All this shows that regional planning in France is still in its infancy. The question was first raised when the Fourth Plan was prepared. If the "operational sections" experiment proves a success, a further step in which regional planning is integrated into national planning can be expected when the Fifth Plan is prepared.⁷

⁷ With respect to regional planning, see Office of the Commissioner for the Plan, "La planification régionale" (17) and "Tranches opératoires régionales" (18).

behaviour of certain economic agents. It might be stated, for example, that household consumption of a particular group of products has a specific elasticity in terms of over-all consumption; or that all enterprises will tend to keep the self-financed part of their capital formation within certain limits.

(c) Other ratios reflect the existence of institutional relationships (e.g. between taxes and income, between social welfare contributions and wages, etc.).

(d) Still other ratios reflect the permanent nature or evolution of certain structures: technical structures (e.g. the ratios between the output of a sector and its consumption of intermediate products); economic structures (e.g. the evolution of the labour and capital share of income, distribution of income among the various sections); financial structure (e.g. percentage division of distributed and undistributed profits).

In a long-term over-all projection, it seems likely that the behaviour, the institutional links or the structures reflected in the above ratios may change spontaneously or be changed deliberately in order to achieve some of the objectives sought.

Moreover, it often happens that this behaviour or these structures cannot be changed by direct action but only through the administrative or economic measures to which they are related. In many cases, the links are, *a priori*, neither automatic nor obvious.

It is thus seen that the entire range of objectives and ratios forming part of the picture of the future situation which the plan will attempt to create, constitutes a whole.

One might be tempted, for argument's sake, to consider the plan in terms of two stages: first, the fixing of objectives and then the study of the means required to achieve them. However, this distinction is superficial and, above all, not easily applicable. Ends and means form a single whole. Some objectives are only desirable if their achievement does not call for inordinate effort. Others will have to be abandoned, either for want of technical means to achieve them or because they would call for a radical institutional change which cannot be contemplated. For example, in a country like France it might be felt that a 5 to 6 per cent growth target, accompanied by fairly stable prices and external balance can be achieved without recourse to unduly drastic measures and without any institutional upheaval. On the other hand a 7 to 8 per cent growth rate would probably call for a much greater measure of austerity, a greater degree of discipline, and the concentration of much wider authority in the hands of the State. This combination of factors must be considered before the over-all growth rate target is fixed.

Such are the considerations which were borne in mind when the broad outline of the technical method to be used in preparing the Plan came to be laid down. The first method which comes to mind is that of translating all the objectives into figures and of setting forth all the ratios in the form of an over-all model to be put into effect at a single stroke.

An attempt would thus be made to ensure not only a state of balance for the economy in the future but in fact the best possible state of balance, the one calculated to bring about the achievement of the greatest number of planned targets at least cost.

In the present situation the implementation of such a method would be extremely difficult. The number of variables is immense. The social, economic and political links are too complex to be defined in a simple way.

Lastly, the objectives of economic policy are in general not pinpointed with sufficient precision (ends and means are, moreover, inextricably linked) and here again it is very difficult to translate them into functions in the mathematical sense of the term.

Moreover, it is very difficult to express the ratios. In theory, a clear separation between given data and unknown quantities may seem an easy matter. But the data themselves may vary by too many factors to make it always possible to tackle a problem by means of parameters. In some cases ratios might have to include conflicting data involving a choice with might often have to be made without clearly defined criteria.

Lastly, the decisions as to choice of method have taken into account the lack of preliminary studies and practice felt in regard to the manipulation of complicated models covering an economy as a whole.⁸

The method of successive approximations was therefore selected. Apart from the reasons given above, account was taken of the fact that there are two very important advantages to this method:

It allows the work to be decentralized, and this is essential in view of the scope of the problems to be tackled. For the preparation of plans in France gradually involves scores and finally hundreds of persons. Such decentralization is particularly useful when the complex nature of the data makes them difficult to convey, which is often the case with respect to factors which it is impossible or difficult to express in terms of quantities in the present state of statistical analysis.

The method of successive approximations also allows a limit to be placed on the gathering of information. The compilation of data on the technical evolution expected and, more generally, on the machinery upon which economic development in the future depends, would be most cumbersome if it had to be exhaustive, that is to say if it had to apply to all possible cases, including those which *a priori* appear unlikely. This work simplified to the extent that it is based on a preliminary assumption as to the general prospects of development and is limited to the collection of data which can be used to supplement, clarify and correct this assumption.

In practice, three types of balances were examined in succession in regard to the final year of the Plan: resources and use of goods and services, the active population, and income and financing. For each the method of successive extensions was applied.

At first a high level of aggregation was taken. Increasingly numerous details were then distinguished. Thus, in the field of production, the studies relate first to the entire range of enterprises, then to three main branches, followed by seventeen sub-branches, etc.

Where contradictions appear as a result of these successive studies, the earlier studies are amended, and so forth, until the results achieved form a coherent whole.

2. THE FRAMEWORK OF NATIONAL ACCOUNTING

Such a method is hazardous because of the danger of getting lost in a labyrinth of constant repetition and leaving inconsistencies which remain undetected. In order

⁸ The Fourth Plan was not prepared on the basis of an over-all model. But an attempt was subsequently made to give the method used a schematic shape. See *Institut national de la statistique et des études économiques*, diagram of the model used in preparing the outlines of the Fourth Plan, July 11, 1962. (16a.)

to cope with this, an attempt was made to express the Plan in terms of figures having a very specific place within the framework of national accounting.

The French national accounts system is particularly well suited to this. Where it differs in some details from the standard system, it does so because from the outset it has had to adapt to the requirements of short-term and long-term projections. No attempt will be made to give a complete description of it, but some of its main features are indicated below:

(a) It includes balances of funds and uses of funds by groups of goods and services.

(b) A nomenclature has been adopted that makes it possible to separate the two aspects of economic analysis, by the agencies concerned and by types of operation. The same operations nomenclature applies to the operations of all the agencies, and the same agency nomenclature applies to the classification of all the operations. This makes it possible, in adopting an accountancy type of presentation, to cross the results of the two analyses in a single table, that is, to put together in an over-all economic table all the information relating both to operations and to agencies.

(c) The French system is completely integrated, and includes within the framework of national accounting both an input-output table and a table of financial operations.⁹

3. THE METHOD OF BALANCES

As already explained, this consists in establishing, for the final year of the Plan, various balances between funds and uses of funds that describe the economic equilibrium of the future.

At each stage of the working out of the Plan as described below, the following three balances will be studied:

(a) *Goods and services balance*

For each category of products the formula is:

$$\begin{aligned} \text{Production} = & \text{Household consumption} \\ & + \text{Consumption by the non-profit sector} \\ & + \text{Gross fixed capital formation (household, the nonprofit sector, and enterprises)} \\ & + \text{Exports-imports} \\ & + \text{Changes in inventories} \\ & + \text{Intermediate consumption} \end{aligned}$$

The general method consists in proceeding from the components of demand to production, by determining, through successive approximations, the values that are not independent (intermediate consumption, gross fixed capital formation by enterprises, and, in particular, imports).

This method is used in its strictest form in the preliminary projections, for which data are few. For the final projection the principle is the same, but the fact that some data are available on production must be taken into account. The striking of a balance thus provides the basis for a selection among superabundant data.

(b) *Labour balance*

This is an over-all balance for the economy as a whole. If it is assumed that full employment (defined as the

existence of frictional unemployment of the order of 1 per cent of the active population) has been achieved, the available labour force can be set down as equal to the labour force required for effecting the production determined by the preceding balance. This is a balance for checking purposes; if there is a considerable difference between the two values, it may be necessary to reconsider the goods and services balance.

(c) *Financial balance*

In the light of the balance of external transactions, the financing capacity of households is taken as equal to the financial requirements of enterprises and of the non-profit sector. Account is taken of the components of the physical balance previously established, and of hypotheses as to the institutional rules and financial behaviour of the various agencies.

This balance takes account, in particular, of the level of household savings, of self-financing by enterprises, and of the national budget deficit. It shows whether or not it is possible to finance the proposed production, and if so, it permits the necessary measures to be worked out.

These three balances are closely interlinked, and many economic magnitudes are common to all of them. As already shown, the three systems of equations are not solved in one operation, but by consecutive steps. The second and third balances can only be struck after the first has been established. The second and third can result in the first being reconsidered, because of the additional conditions they impose on the implementation of the first balance.

4. GOODS AND SERVICES BALANCE

(a) *Projection of the components of final demand*

(i) *Household consumption.* The general method consists of breaking down household consumption into a given number of consumption groups, and projecting the development of the percentage represented by each of these groups in total consumption. The groups in question are food; clothing; housing; health and hygiene; transport and communications; culture and spare time activities; hotels, restaurants and miscellaneous.

Many of these are further divided into sub-groups. The purchases made by the different groups in the products nomenclature are then broken down for each consumption group, the basic tool being a consumption group-products matrix drawn up for 1959.

The main factors governing the projection are given below.

Demographic data

— Estimate of the total population (broken down into agricultural and non-agricultural, in order to allow for the special characteristics of the consumption of the agricultural population);

— Estimate of the number of households; and

— Estimate of the number of units of consumption.

Data on income and prices contained in the general directives

In estimating the future development of consumption, three main sources are used in conjunction:

— The national accounts series established for the ten previous years (1949-1959);

⁹ The features of the French system of national accounts are explained in *Les comptes de la nation*; volume II, *Méthodes*. Imprimerie nationale, 1960. (2)

— The results of the sampling survey carried out in 1956 on family budgets;

— International comparisons with countries whose national income is higher than that of France.

Direct estimates are made for certain products, in particular with respect to:

— Rentals, where account is taken of the expected increase in housing inventories, and of the legislative provisions regulating rents;

— Durable consumer goods (especially cars and household appliances); the number of objects purchased during the course of the final year is equal to the sum of the increase in inventories and the replacement of goods that have become unserviceable.

Projection of consumption requirements is attended by some uncertainty because certain phenomena, such as substitutions, the influence of the price structure, and the production of new lines, could only be studied rather cursorily.

However, it should be added that this uncertainty is more marked in the projection by consumption groups, whereas the breakdown by products may give rise to offsetting effects.

(ii) *Consumption by the non-profit sector.* The following are considered, in succession:

— Military consumption, as determined by the programmes embodied in legislation, and information from the Ministry of National Defence;

— Civil consumption, broken down into ten groups; four representing the various levels of education; roads and highways, harbours, airports, work carried out by international bodies, and miscellaneous.

The transition from consumption groups to products is then made as for household consumption.

(iii) *Investment by the non-profit sector.* This is established in the light of demographic factors and guidance given by the Government, and is broken down into the following categories: educational facilities, public health and welfare facilities, parkways, roads and highways, electrification, water supplies, sanitation facilities, urban improvements, harbours and airports, and miscellaneous.

In the preliminary projections requirements are assessed after direct inquiries of the bodies concerned; for the final projection, they are studied by the specialized Commissions. Where necessary, the Commissioner-General of the Plan arbitrates in the matter, after consultation with the Budget Department.

For the Fourth Plan, the top priority in the field of non-profit investment has been given to national educational needs.

(iv) *Household investment.* This is represented by the housing construction targets. It takes into account requirements determined with the help of the studies of the Commission concerned, and of the possibilities of financing the requirements, decided in consultation with the Treasury and Budget Departments.

The Commissioner-General of the Plan and the Government have the final say.

(v) *Foreign trade.* The projection of foreign trade is one of the most difficult of all planning problems. Many hypotheses have to be made as to the course likely to be followed by world trade, the behaviour of the principal trade partners, and so forth.

For the Fourth French Plan, the problem is further complicated by the fact that the base period includes important

political and administrative changes, changes in the franc area, and the setting up of the European Common Market.

The Plan takes into account the developments regarded as the most probable in the light of the present direction of government policy.

It has been assumed that the world economy has been growing at a rate close to 3 per cent, and that French foreign trade maintained more or less its relative position. The goal selected represents a small over-all surplus in the balance of payments. Thus a surplus of exports of goods and services must be sought that will both account for this total surplus, and also offset the outflow abroad. In assessing this outflow, particular consideration was given to the goal of French aid to countries in the course of development, both within the franc area and outside.

In the case of products, the forecast has been made separately for imports and exports, with reference to about fifty products. Imports of raw materials and energy products are linked to the production levels of the various branches. Imports of finished products, and exports, are determined in the light of exogenous factors, especially since the trend is towards liberalization of foreign trade.

For the final projection, use has been made of the studies of the so-called "vertical" Commissions, and of the foreign trade group of the General Economic Commission. Arbitration have had to be resorted to in order to bring the trade balance resulting from the aggregation of the figures given by the vertical commissions to a reasonable over-all figure. Special problems arose regarding the motor vehicle industry, textiles, and agricultural products.

(b) *The problem of determining investment*

(i) *Preliminary remarks*

(1) Investments for the final year are in principle totally independent of production for that year, which is linked only with the investment for the preceding years. Nevertheless, it should be pointed out that the final year is always regarded as an average year not characterized by any special feature in relation to long-term evolution. Thus investment for the final year will be so determined as to permit the maintenance of the same pace of growth as for the adjacent period.

(2) The demand for investment goods include, in particular, the requirements of the branches that themselves produce such investment goods. The system involves a process of iteration; this is all the more necessary because only certain branches produce goods used as investments (essentially construction and public works, and the metal-transforming and electrical industries).

In most cases the starting point of the process of iteration is the result obtained during the preceding phase of the implementation of the Plan.

(3) Investments are first calculated branch by branch, and then the investment distribution by products is studied for each branch.

(ii) *Determining investment by branches.* The method varies according to the branch.

(1) Sometimes a direct method can be used, consisting of enumerating the specific projects that will produce the output target. This applies, for example, to power, railways, steel and aluminium production. The information provided by the Commissions, or in the preliminary stage by the experts consulted, is sufficiently exact and detailed.

For a different reason the same method applies to agriculture. Here the link between output and investment is much looser in the short run. The investments are aimed at setting standards; they are directed much more towards farm modernization and reducing costs, and their effects are particularly likely to be felt at long range. In this case the opinion of the Commission is sought.

(2) For the other branches, gross marginal investment coefficients are used. These are determined in different ways — by studying past series, with basis of data from other countries, or through the views of experts. The aim is as far as possible to take into account expected changes in production techniques and in the structure of the branch concerned.

The next stage is to make an over-all check by calculating for the economy as a whole the investment coefficient obtained by adding together the results for the individual branches.

(iii) *Investment by products.* The transition to investment by products is made on the basis of technical developments, either as directly known (for example the ratio of thermal to hydro power production), or as estimated from the over-all standpoint (for example the increasing share of electrical equipment in the investments of most branches).

It should be noted that the structure of investment broken down by products is much less dispersed than the breakdown by branches; this is due to the existence of compensating effects between the various branches.

(c) *Determining intermediate consumption*

For this purpose the input-output table for the base year (1959) has been used. It covers sixty-five branches, and uses the same product nomenclature as that used for the components of final demand.¹⁰

This table is projected for the final year, 1965, by introducing all the changes in technical coefficients that can be foreseen. These changes may be due to a number of causes.

(i) *Technical development proper.* This applies, for example, to the volume of coal used for electric power production; to economies of coke in the production of cast iron as a result of ore agglomeration, and to the trend towards reducing the weight of steel used in metal-transforming machinery. In many cases such technological data are fairly precise in relation to 1965. They are less so for 1975, but the trends in technical progress are fairly well known. Changes in the nature of a product raise certain problems; for example, the tendency to make metal-transforming machinery lighter is in fact offset by an increase in the use of special steels whose average cost is higher. Experts sometimes find it difficult to determine the resultant of two trends having opposite effects on the coefficients.

(ii) *Substitution effects.* These are often closely linked to those discussed in the preceding paragraph. Coke economies in steel manufacture are combined with a partial substitution of petroleum products. Substitutions are particularly notable in the case of organic chemistry products: plastics replace metals, synthetic raw materials replace natural raw materials, plastic packing materials replace paper or metal materials, and so forth. It is sometimes difficult to obtain concordant forecasts for the

producer and user branches, which may have different views, if not on the actual trend of substitution effects, at least on their scope.

(iii) *Change in the structure of the aggregated branches.* This probably has a greater influence on the variation in technical coefficients than the first two effects. In principle, the projection is made for sixty-five branches, but most of these are fairly broad aggregates that include rather heterogeneous products, with respect either to the product itself or to the method of manufacture. Information may be available from working groups on the evolution of the techniques concerned. In many cases the projection is difficult to make because no complete picture is available of intermediate consumption for the component sub-branches. Consequently the cause of development is approximate and errors may arise as a result. Other cases are comparatively simple: for example the ratio of thermal to hydro generation of electricity for 1956 is known, and the consumption of coal can be deduced in the light of the effect referred to under (i) above. It will be more difficult to determine the technical coefficients, say, for the electrical industries, which produce both heavy equipment, where development is slower, and radios and household appliances, where growth is very rapid. The attempt has been to give the appropriate weighting to each of these two lines of development in estimating intermediate consumption of steel and copper.

(d) *Calculating output*

In making the preliminary projections, output is calculated on the basis of a table giving final demand for the various items, and imports. It is only necessary to verify that the output goals as thus defined are not ruled out by the physical possibilities, which would only happen in exceptional cases. If it did, any possible bottlenecks could be removed by taking steps immediately.

For the final projection the data available, from a variety of sources, are much more abundant. In striking a balance for a given group of products, use can be made of production estimates made by the Commission concerned, requirements reported by the purchasing branches, and estimates of final demand prepared by experts on household consumption, foreign trade, the needs of the non-profit sector, and, if necessary, investment. These various estimates suffer from a fairly wide margin of uncertainty. Known data and unknown quantities are not as distinct as in the classic model; the components of final demand can still be regarded rather as data, but are subject to the effects of chance sometimes to a large extent, while output remains an unknown, although there is a not inconsiderable amount of data available on the subject.

This situation is not as paradoxical as it seems. Estimates of production in fact come from an explicit or implicit study of the market by the producer branch, although this assessment is sometimes of a general and intuitive nature. Output is always calculated with final demand as the starting point, but there are several overlapping assessments of the demand for certain items.

The table makes it possible to detect contradictions, to determine their origin and to prepare the basis for selection. This may be the result of agreement among those concerned, or possibly of arbitration if the differences prove irreconcilable, or even a government decision representing a choice between competing programmes by various government departments.

¹⁰ For the structure of the input-output table for France, see *Les comptes de la nation*, op. cit., (2).

Arbitrament of this kind must take place as the table is being worked out sometimes after long consultations. Each decision affects production in the supplier branches.

The restrictions resulting from the use of the table and the nature of the figures included in it appear to rule out, at present, a wholly mechanical calculation of outputs on the basis of the synthesizing studies. Thus manual calculation is used, and this is facilitated by the fact that although the table for France cannot be strictly triangulated, an approximate triangulation is possible, requiring only a few iterations that can be fairly easily localized. A general machine calculation would be of full value only if a very large number of variables could be studied.

Agriculture constituted a special problem. Experts agree as to the "inevitable" nature of the output of certain commodities, especially cereals and milk products. The problem here is to work out how this output can be used either domestically or abroad, and in the last resort to assess the volume of stocks that will accumulate.

5. LABOUR BALANCE

As previously shown, successive projections are made for the supply and demand of labour.

(a) *Projection of labour supply*

The available active population is first projected on the basis of the rates of activity in the 1954 census. Then corrections are introduced to allow for the raising of the school-leaving age (because of legislative provisions and natural evolution), immigration (especially from Algeria and the Common Market countries), the lowering of the retirement age, and the increase in the rate of female employment.

The figure for the armed forces intake represents a military service of 18 months. Frictional unemployment affects about 1 per cent of the active population.

(b) *Projection of manpower requirements*

Successive studies are made of the requirements for the civil service (broken down into six main categories), the armed forces, domestic staff, agriculture, industry and services.

The active agricultural population is based on an average annual reduction of 70 000 persons, slightly less than that recorded in the past. However, the number of departures is higher, since additions to the active agricultural population include the young workers born in 1946. The Agriculture Commission has estimated this figure as high as possible, in relation to existing economic and social pressures; it may actually be too low.

The active population needed in industry and services was calculated branch by branch by dividing the proposed output by the productivity index suggested by the experts.

The annual growth rates of productivity range from 2.5 to 7 per cent, depending on the branch concerned. In the light of the productivity rates assumed, it can be stated that full employment has been substantially achieved.

If it transpires that the rates have been set somewhat too low, or that the labour supply has in fact been underestimated, it will be necessary to consider reducing working hours between now and 1965. This should not

be necessary until the second part of the period covered by the Fourth Plan.

6. FINANCIAL BALANCE

(a) *General remarks*

The financial balance is studied after the goods and services balance; the latter is taken as settled, and the question is to find the financial means of implementing it. If this cannot be done, the balance in respect of physical inputs and outputs will have to be reviewed. If it can be done, it remains to determine the necessary measures.

The factors taken into account are the government directives — "Expansion with monetary stability" and the protection of prices and public financing from pressures —, and existing limitations, either rational (total saving equals total investment), or pragmatic. The latter include the tax system, self-financing practices of enterprises, household savings, and the ratio between wages and profits. Changes in some of these items are conceivable, but the assumption that there could be violent distortions of the pattern has been ruled out.

It may be that a number of different solutions are possible for the financing of a given physical programme. A number of distinctly different types of balance will be studied.

(b) *Method used*

This consists of projecting for 1965 simplified accounts for households, enterprises and the non-profit sector (current accounts and capital transactions), applying all the necessary hypotheses during the process. Then a balance is struck between requirements and financial means (taking account of the external balance of payments). Then a study is made of the possible limits of variation of the parameters introduced, in the light of changes in the hypotheses applied.

(c) *Constructing a balanced account to use as a starting point*

(1) *Household savings.* Here the variable chosen is the propensity to save (or the rate of savings of households) represented by the quotient of savings and consumption. The rate selected was 13.2 per cent, representing the highest value recorded during the previous period (1955).

The household accounts are supplemented by successive studies of direct taxation, wages and income of individual entrepreneurs, and social transfers. From this the financing capacity of households is established.

(2) *Borrowing by enterprises.* The accounts for enterprises are constructed on the basis of the factors already known (production, wages and salaries, income of individual entrepreneurs) applying additional hypotheses as to taxation.

The rate of borrowing among enterprises must then be fixed quotient of their need for financing and the total of their gross investment. The rate selected was about 29 per cent, close to that for 1958, which was the highest recorded in recent years. This gives the financing requirements of enterprises.

(3) *Financing requirements of the non-profit sector.* Because of the way in which the various bodies are interrelated, the accounts for the non-profit sector are automatically determined, in particular their need for financing.

Specific hypotheses as to Treasury loans to local bodies, and as to the contribution of the Exchequer to the financing of construction, makes it possible to determine the total amount representing the Treasury's "impasse" — excess of total expenditure over total income.

(d) *Study of the different kinds of balance possible*

On the basis of the preceding balance, a study can be made of whether other forms of balance, obtained by changing some of the selected hypotheses, are possible, the aim being to attempt to find, in each case, the corresponding forms of action that the State should undertake to implement them.

The possible variants were studied by first changing the hypotheses on the public deficit and, for each one, verifying the rate of household savings and the rate of enterprise borrowing. These three variables are linked by the logical requirements that total financial capacity and requirements should balance. To study possible

balances, use can be made either of a double entry table, or a graph with triangular co-ordinates. Each balance has to be studied in conjunction with the measures required to put it into effect.

(e) *Projection of financial channels*

To complete this study of financial balance, successive studies were made of (i) the total and structure of investment by enterprises and households in the light of various hypotheses relating to greater or lesser liquidity of these investments, and (ii) the nature of the intermediary financial bodies which will carry out these operations (the Treasury, the banks, or others).

Thus it was possible to project the accounts for the various financial intermediaries and to ensure that these accounts would balance.¹¹

¹¹ For further details on the construction of the financing balance, see *Rapport introductif du groupe de l'équilibre de la Commission de l'Economie Générale et du financement*. (9).

V. THE PROCESS OF PREPARING THE PLAN

Mention has been made of the agencies taking part in the preparation of the Plan, and a description has been given of the technical instruments, used for the purpose. It now remains to show how these agencies and instruments were actually employed in the chronological development of the operations involved in preparing the Plan. This obviously entails some risk of repeating what has already been said; but such repetition can hardly be avoided if an idea is to be formed of how the operational process works out in practice.

As has been pointed out, the preparation of the Plan is based essentially on a method of successive approximations. This is applied in all spheres:

(a) In determining the rate of growth. A range extending from 3 to 6 per cent was first explored, and after subsequent consideration of a rate of 5 per cent or thereabouts, a definitive figure (5.5 per cent) was established;

(b) In working out details. An aggregate projection was first considered, and later broken down successively into 3, then 17, then 28 and lastly 65 branches;

(c) In relation to breadth of coverage and diversity of external participation. During the initial stage, work was virtually confined to the activities of a central team. Gradually, as the Plan progressed, the number of collaborators was increased. Once when the Commissions and working groups came into operation, they comprised more than 3 000 persons, themselves in contact with a far greater number of sources of information;

(d) In the give-and-take between technical studies and government decisions. The studies paved the way for the decisions adopted, but at certain stages a decision had to be made in order to settle the choice between several variants; on the basis of this choice it was possible to proceed with the projects envisaged.

1. CHRONOLOGY OF THE PREPARATION OF THE FOURTH PLAN

Such a process is necessarily long and complex. It took three years to prepare a Plan covering a period of four years (1962-65), in accordance with the following schedule:

January — July 1959

Establishment of preliminary projections for 1975

September 1959 — April 1960

Policy-making phase culminating in a pronouncement by the Economic Council and the issue of directives by the Government

Summer 1960

Constitution of the Commissions

October 1960 — May 1961

First part of drafting phase, culminating in the establishment of a provisional synthesis

May 1961 — November 1961

Establishment of the definitive synthesis. Approval of the Plan by the Government — discussion by the Economic and Social Council

July 1962¹²

Plan passed by Parliament.

2. PRELIMINARY WORK RELATING TO THE YEAR 1975

Before what may properly be termed the preparation of the Plan and the study of its final year (1965) were embarked upon, it seemed useful to carry out preliminary research which would shed light on the longer-term future.¹³ To this end, a projection for the year 1975 was formulated on the basis of three different growth hypotheses.

The pertinent studies do not form part of the Plan proper; they have not been published, and the forecasts they embody do not in any way commit either the Office of the Commissioner for the Plan or the Government. They were, however, a most useful exercise from the standpoint of giving the planners a long-term outlook and making them use their imagination.

This forecasting work leaves much to be desired as yet; in the future it will have to be improved upon both

¹² The passage of the Plan through Parliament was held up until the summer of 1962 for political reasons. But from the technical standpoint, it could have been discussed in December 1961, that is, in good time to enable the Fourth Plan to be put into operation in January 1962.

¹³ *Premières perspectives sur l'économie française en 1975*. (14)

in scope and in depth. As it is, it enabled the development process to be roughly mapped out and the aspects particularly calling for further study to be pinpointed. In considering a period of fifteen years, certain phenomena become apparent which are difficult to detect when looking only a few years ahead.

No special methodology was applied in relation to the projections for 1975. Rates of growth of 3, 4.5 and 6 per cent were considered, and the economy was broken down first into 3 and 10 into 17 branches. Very little recourse was had to external co-operation. Expert advice was asked for only in connexion with certain sectors whose technical evolution displays fairly marked characteristics (power, steel making, transport, public investment, etc.).

3. PREPARATION OF THE PLAN: POLICY-MAKING PHASE

The policy-making phase extended from the summer of 1959 to the spring of 1960. It consisted in exploring the avenues of development envisaged, in order to enable the Government to lay down the broad lines that the Plan was to follow and determine the rate of growth which was to serve as a basis for the work of the Commissions.

To this end, a certain number of "profiles" indicating the main features of the various possible types of economic development were established at the request of the Commissioner-General for the Plan by the Economic and Financial Research Service of the Ministry of Finance, in consultation with the experts from the Office of the Commissioner.

It was possible to reduce the number of these profiles considerably on the strength of the over-all hypotheses taken as starting-points. In the case under discussion the only alternatives contemplated were those which ensured more or less steady development, without drastic changes in the existing economic and social structures.

In such conditions, rational assumptions can be made directly in respect of the final year. The evolution of the growth mechanism during the intervening period is not studied until later, so that an attempt can be made to bring to light the potential difficulties that may jeopardize the results envisaged for the final period.

Similarly, in so far as local disequilibria are not unduly serious, the study of regional problems can be postponed to a later stage, and the national economy as a whole can be considered directly.

Furthermore, the restriction of the study to a relatively short period means that data regarding population trends and the formation of the labour force can be regarded as virtually exogenous (although these may be factors of decisive importance over the longer term).

It was further assumed in the present instance, that only limited changes in income distribution would take place, and that they would make no radical difference to the pattern of consumption trends.

Given the foregoing postulates, the rate of growth becomes the decisive variable. The structure of final demand corresponding to a specific rate of growth will vary only within fairly narrow limits.

The policy-making process may therefore be summed up as follows. Consideration is given to rates of growth falling within a range of figures that seem to represent practical possibilities. In relation to each of these, a profile of the national economy is constructed for the final year of the Plan. In each case, different marginal variants are then studied, corresponding to different hypotheses as

to the composition of final demand. In reality, the construction of the profiles and the selection of the variants are inextricably bound up together.

(a) *Construction of profiles*

In order to construct the profiles of the economy, a projection for 1965 was worked out from the national accounts for a base year. As was shown above, balances were established in turn for goods and services, manpower and financing.

The goods and services balance was first established in global terms for the economy as a whole. It was then broken down on the basis of a three-sector model — agriculture, industry and services. The projection was next formulated for 17 and then for 28 separate categories of goods and services. With regard to manpower, the balance was determined as indicated above, and supplemented by a study of skills and qualifications (in respect of six major categories: engineers, technicians, etc.) and a study at the level regional. In so far as bottlenecks were to appear in certain branches, readjustments could be introduced in the balance relating to goods and services. In the case of financing, the balance was established globally, in the manner set forth above. But the analysis of the financing patterns of enterprises on which the study of the over-all balance is based is inadequate. Separate consideration should at least be given to agriculture, private undertakings and public enterprises. As a more general rule, the same number of branches or sectors should be differentiated as in the study of the physical balance.

Attempts have been made in this direction, but they are still of an experimental nature.¹⁴ The problem is a complex one. It is not really possible to formulate hypotheses on margins of self-financing in each branch of activity independently of the hypotheses already established in relation to price levels. These latter are a function of technical coefficients and prices of intermediate products; coefficients of labour and wages; interest charges; the tax system; distributed profits; and self-financed investment. If there is any incompatibility between the margins of self-financing acceptable to enterprises and the price system originally adopted, the latter must be readjusted and the physical balance subsequently modified with due regard to the effects of substitution. Should it prove impossible to hit upon a price system compatible with existing limitations (impracticability of raising certain key prices, unwillingness of enterprises to resort to borrowing, etc.), an endeavour must be made to seek a solution by manipulating the parameters constituted by the instruments of economic policy: taxes, subsidies, borrowing on the part of public enterprises, etc.

As stated earlier, this process of determining the balance in respect of financing is accompanied by a study of the channels of circulation through which savings may be distributed in conformity with the wishes and needs of savers and investors. An effort is made to forecast the probable role of the various financing agencies (the Treasury, banks, specialized financial institutions) by means of a projection of sources and uses of funds formulated within the framework of a table of financial operations.

In practice, the behaviour pattern of enterprises and

¹⁴ A. Nataf and P. Thionet, "Modèle à prix variables et plans de développement", *Etudes de Comptabilité Nationale*, Imprimerie Nationale, 1962. (21)

households is too unpredictable for the study of the financial balance to culminate in a series of rigid measures. Nevertheless, by virtue of such a study the hazards involved in the attainment of the established targets can be evaluated, and the responsible authorities are thus better prepared to cope with them.

(b) *Study of variants and choice of policy*

The aim of this stage of the work is to classify and compare a certain number of possible alternatives, so that from among these a selection can be made by policy-making bodies.

(i) *Study of variants* The situations resulting from the selection of different levels of final demand are studied in turn, and then the possible changes in the structure of this demand. In principle, a wide range of growth rates should be studied to begin with, but it must be remembered that certain basic hypotheses on the country's future development were postulated at the outset.

These hypotheses are as follows:

At the internal level, the absence of institutional upheavals (in particular, it is assumed that the restrictive instruments at the Government's disposal will not be significantly reinforced);

At the external level, the development of international economic life, especially as regards the relations of France with the European Economic Community and the countries members of the franc area. This development too is assumed as due to take place without drastic upheavals.

These basic hypotheses set an upper limit to the choice of possible rates of growth. Indeed, it would be absurd, in the study of a plan that aims at setting up standards, to consider rates of growth which are definitely below what can be expected from the spontaneous evolution of the economy. This establishes a lower limit for the range of growth rates considered. In practice, the useful area was regarded as lying between 3 per cent and 6 per cent for the rate of growth of gross domestic production.¹⁵

A possible method of more thoroughly exploring the useful area thus demarcated and determining whereabouts in it lie the growth rates that can be reasonably envisaged, is to establish a preliminary profile in which the rate of growth is approximately in the middle of the useful area, and then, by a series of approximations, to construct other profiles corresponding to higher or lower rates; or, again, a series of profiles corresponding to rates covering the whole of the useful area can be simultaneously established. It was this last procedure that was selected for the formulation of the Fourth Plan. Three profiles were actually constructed, corresponding approximately to rates of growth of 3, 4.5 and 6 per cent.

For each growth rate, changes in the composition of final demand may be envisaged. They may relate on the one hand to the relative proportion of consumption and investment, and on the other to the structure of consumption, which is itself linked to action on the part of the public sector, whether direct (in the fields of education,

public health, etc.) or indirect (measures affecting prices and income distribution).

Hitherto, the study of variants of this type has not been carried out systematically and on a quantitative basis. Within the framework of the hypotheses established, and given the method adopted, the divergencies between these variants cannot be very wide, since action capable of radically altering rates of investment or the structure of consumption is not contemplated. Nevertheless, some of the marginal variants to which particular interest attaches have been studied on a qualitative basis (effect on consumption produced by measures to benefit the underprivileged groups, for example).

(ii) *Selection procedures.* The studies dealing with the three variants indicated above were submitted to the consideration of the Economic and Social Council.¹⁶ At the same time, the Commissioner-General for the Plan stated that in view of the requirements to be satisfied on the one hand and the difficulties encountered on the other, he thought a reasonable choice would be a growth rate lying between 4.5 and 5.5 per cent.

On the basis of the documents in question, the Economic and Social Council undertook two further studies. The first dealt with the problems arising out of the development of consumption and advocated a more significant effort to meet social needs. The second related to the growth rate that should be taken as a point of reference for the work of the Modernization Commissions, and recommended a high rate of growth.

After consideration of these two studies, the Government, in directives addressed to the Commissioner-General for the Plan, laid down the broad guiding principles for the Fourth Plan and established the growth rate on which the work of the Commissions was to be based. The rate chosen was 5 per cent, but the Government requested the Commissioner-General to examine the possibilities of achieving a slightly higher rate.

4. PREPARATION OF THE PLAN: DRAFTING PHASE

Once the broad guiding principles for the Plan were established, drafting proper was able to begin. The aim of this phase was to define precise objectives and measures for each sector of the economy.

It was in this second stage of the preparation of the Plan that the Commissions referred to above began to play their part.

(a) *The work of the Commissions*

Obviously, the task of the Commissions differs from one sector to another. But, from the outset, a great effort was made to achieve homogeneity, so that the ensuing work of synthesis might be successfully carried out.

To facilitate the work of the Commissions, projections consonant with the Government's directives were formulated for the last year of the Plan and distributed to the rapporteurs. These projections took the shape of estimates of goods and services and labour prospects, relating to 28 branches of production, and calculated by interpolation on the basis of the preliminary profiles. However, they proved insufficiently detailed to meet the needs of some of the working groups, and had to be supplemented by partial projections. These detailed forecasts were in no way binding. They served as provisional background

¹⁵ The notion of "gross domestic production" is a common concept in the French national accounts. It differs from that of the "gross national product" in respect of a number of components (principally in that it does not include services rendered by employees in the non-profit sector). A growth rate of 3 to 6 per cent for gross domestic production roughly corresponds to a rate of 2.8 to 5.6 per cent for the gross national product. For further details on the relationship between the two notions, see *Les Comptes de la Nation*, Vol. I, pp. 10 to 13. (2)

¹⁶ See *Les perspectives de l'économie française pour 1965*. (15)

material for the rapporteurs, who were thus able to begin their work without awaiting the findings of the studies prepared by other Commissions.

Furthermore, a set of hypotheses on the evolution of the structure of prices during the period covered by the Plan was submitted to the rapporteurs of the "vertical" Commissions. It was compiled on the basis of three studies, namely, an analysis of the trends registered in the past; a projection formulated with the help of a model taking into account changes in costs, in the fiscal system and in patterns of financing;¹⁷ and a survey carried out among a number of experts.

A projection of the sources and uses of income and financing was established without differentiation between the various sectors of production. It was primarily intended to serve as a guide for the work of the General Economic and Financing Commission.¹⁸

The first stage of the Commissions' work was carried out during the summer and autumn of 1960. After four to six months of work, the Commissions reported on their preliminary findings. These were still provisional, and subject to revision and completion through the work of synthesis.

(b) *Synthetization and arbitrament*

As soon as the earliest reports of the Commissions had been centralized, the process of synthetization was begun in co-operation with the "horizontal" Commissions, i.e., the Manpower Commission, and the General Economic and Financing Commission. From then on, two parallel processes were to develop simultaneously: the completion of the reports of the "vertical" Commissions, and the establishment of syntheses.

The work of synthetization itself comprised two more parallel processes, one of a technical nature, aimed at bringing to light possible inconsistencies, the main responsibility lying with the Economic and Financial Research Service; and one consisting in the adoption of decisions, leading up to arbitraments and concerning the "horizontal" Commissions, the Commissioner for the Plan and the Government. In this twofold process, several phases can be distinguished, in the course of which a further synthesis was established on the basis of the arbitraments already secured and further arbitraments were applied for in the light of the results obtained.

(i) *The provisional synthesis.* The object of this was to detect and remedy possible disequilibria and inconsistencies, to check whether the equilibrium achieved complied with the government directives and to pave the way for the final arbitraments.

The consistency of the programmes of the various Commissions and working groups must be ensured from a number of standpoints: internal consistency within the programmes for each branch of activity; consistency of the lines of development contemplated for the different branches of activity; consistency of development trends in production or investment with the measures proposed by the Commissions to make them possible (subsidies, prices, fiscal system, etc.); and compatibility of the measures proposed by different Commissions.

The selections to be made, and ultimately the requisite arbitraments, are effected at different levels according

to the significance and nature of the problems concerned. Some questions can be settled through direct contact among the various Commissions; others require the intervention of the Commissioner-General for the Plan or of the Government. In practice, the selections to be made in the course of preparation of the Fourth Plan were so numerous that no list even approximately incomplete can be given. A few examples only will be cited.

Some selections constitute actual decisions, either at the global or at the sectoral level. The most important was the Government's decision, adopted towards February 1961, to raise the average annual growth rate to 5.5 per cent. This decision was taken in the light of the early studies of the Commissions, which revealed a slight tendency towards a manpower surplus when a hypothetical growth rate of 5 per cent was postulated.

Other government decisions related to public investment programmes, pursuant to discussion with the Budget Department and the various Ministries concerned. The general tendency of the arbitrament was to give top priority to investment in schools and universities, at the expense of some other sectors, such as highways, telephones, etc.

In relation to specific sectors, mention may be made, for instance, of the determination of quotas of textile imports from developing countries; a balance was struck between the somewhat narrow outlook of specialists in that branch of industry and the broader views of the foreign trade group. By virtue of the arbitrament in question, the existing quotas were considerably increased.

Other arbitraments do not reflect, like the foregoing, actual decisions to be taken in the present or the future. They relate rather to the selection of the most likely trend for incorporation in the projection. Thus, for instance, in connexion with the development of plastics, the Commissioner-General for the Plan had to choose between the projections of the transforming industry and those of the producers of raw materials, who had different ideas on future development trends. Clearly, an arbitrament on this point, while based on all the data and studies available, is nevertheless not to be interpreted, like the preceding examples, as a sort of government commitment; it is more contingent upon the course of events.

The decisions of the Government once made known, synthetization proper began. The figures submitted by the working groups were adjusted, in consultation with the rapporteurs, in order to take the Government's arbitraments into account. They were the subject of a twofold study dealing with the final year of the Plan period, on the one hand in physical and on the other in financial terms.

This is the stage at which divergencies between the development hypotheses adopted by the branches of activity concerned (supplier and consumer branches) must be submitted to arbitraments. Since every change in the figures prepared by one Commission has repercussions on all the rest, this work involves a series of iterations which in theory may be somewhat lengthy. Nevertheless, thanks above all to the existence of a preliminary balance, the divergencies were in practice fairly quickly reconciled.

This process of reconciliation entails constant direct contacts between the various Commissions. In the case under discussion, it was simplified by the fact that all the projections had been formulated within a common national accounting framework which threw into relief the factors making for disequilibria.

¹⁷ See A. Nataf and P. Thionet, *op. cit.* (21)

¹⁸ See introductory report of the Balance Group of the General Economic and Financing Commission.

(ii) *The definitive synthesis.* When the final arbitraments had been issued, the substance of the Plan was incorporated in a statistical synthesis designed to serve as reference material for its implementation. In order

to establish this definitive synthesis, the calculations resulting from the provisional synthesis were first revised, and the objectives of all the basic branches of activity were then overhauled.

VI. IMPLEMENTATION OF THE PLAN

The implementation of the Plan involves problems of both knowledge and action. In very general terms, it must first be pointed out that the way in which the Plan is prepared plays a highly important part in determining the possibilities of its implementation. The very fact that a great many persons participate, directly or indirectly, in the formulation of the Plan makes it widely known in professional circles. Private enterprise, or at any rate large firms, in drawing up their own long-term programmes, tend to envisage them within the over-all framework defined by the Plan and to take the situation it describes as a working hypothesis on which to base their own studies. The Plan's presentation of a consistent over-all balance for the final year of the period clearly affords a powerful inducement to all economic agents to comply with its recommendations.

Under the economic and social system prevailing in France, it would unquestionably be an impossible task for the public authorities to ensure the implementation of a plan that had been prepared only within the restricted circle of the Government's technical experts. It is none the less true that such psychological motivations would not in themselves be sufficient. The State must make use of all the instruments for acquiring information and taking action that it has at its disposal, if it is to succeed in channelling the behaviour of independent economic agents in the direction laid down in the Plan.

In order to give a precise idea of the questions linked up with the execution of the Plan, a distinction must be drawn between the action that must be taken globally, at the level of the economy as a whole, and the measures that specifically concern certain sectors. A similar differentiation must be made, as regards the implementation of the Plan, between those fields over which the State has direct control and those in which it can intervene only indirectly.

Another point to note is that the problems connected with knowledge and with action are closely inter-related. Before an account is given of the executive instruments proper, it may be well to review rapidly the difficulties which arise.

1. PROBLEMS ARISING OUT OF THE IMPLEMENTATION OF THE PLAN

To speak of the implementation of the Plan implies being in a position to carry out the following operations:

(a) To form as continuous and as detailed as possible an idea of how the economic situation is developing as the period covered by the Plan goes by;

(b) To compare the existing situation with one outlined for reference purposes and thought to be compatible with attainment of the objectives of the Plan for the final year of the period;

(c) To see that the measures contemplated at the time of the preparation of the Plan are adopted at the appropriate moment, and, should the need arise, to propose

new over-all or specific measures if those originally projected are deemed inadequate;

(d) To revise the objectives of the Plan, if circumstances so require.

The first two operations, which are purely concerned with fact-finding, seem *a priori* fairly simple. As a matter of fact, they are by no means easy to put into effect, mainly for the following reasons:

(i) They imply the availability of a complete, consistent and detailed estimate, complete with figures, of the economic balance for the final year of the Plan. The aim of the definitive synthesis is to provide such an instrument. In practice, it was only during the preparation of the Fourth Plan that a consistent and exhaustive synthesis of this kind was established; the procedures adopted in the implementation of the Third Plan were much more rudimentary. It is therefore too soon to determine how far the instrument prepared for the Fourth Plan will prove efficacious;

(ii) The Plan establishes objectives for the final year (1965), which is defined as midway along the evolutionary curve. But it does not set up detailed targets for all the intervening years. The Fourth Plan does not explicitly trace a path along which each milestone can be used as a point of reference for evaluating the economic situation in a given year. It is not clear *a priori* that the Plan should be implemented in all fields in four equal annual sections. Allowance may have to be made for certain conjunctural situations, for weather contingencies affecting agricultural production, for the expansion of programmes in certain branches of activity where development is rapid, etc. At any given moment, therefore, comparison of the existing situation with the situation which would enable the Plan to be fully implemented by the final year is not an automatic process. It implies a qualitative analysis of the evolution of the economic situation, and consequently is subject to difference of opinion and conflict of interpretation. This is one of the reasons why the authorities wish to invoke the help of consultative agencies during the period of supervision of the implementation of the Plan just as they did during its preparation.

2. OVER-ALL INSTRUMENTS

The over-all instruments are those available to the State for securing information on the economy as a whole and channelling its development.

(a) *Economic budgets*

For ten years now the Economic and Financial Research Service of the Ministry of Finance has been establishing "economic budgets", i.e., forecasts of the national accounts which enable the Government's objectives and economic estimates for the forthcoming year to be explicitly set forth. In particular, the finance bill which the Government submits to Parliament every autumn, defining its budgetary and economic policy for the following year,

has been accompanied since 1952 by the presentation of an economic budget.

It is impossible, within the scope of the present paper, to expound in detail the nature of the annual economic budgets. Suffice it to say that they are increasingly based on the current four-year Plan. Every year, the economic budget has to determine, with due allowance for what has been achieved in previous years and for the special position of the coming year in relation to the evolutionary curve, what will be the yearly tempo best suited to the implementation of the Plan and what measures should be adopted to ensure that this tempo is maintained.

If, for instance, the Plan contemplates an annual rate of growth of 5.5 per cent for the gross domestic product, and at the end of a given year it becomes apparent that in consequence of a recession in some countries exports are likely to decline instead of increasing at the rate defined in the Plan, it will be reasonable to adopt a rate lower than 5.5 per cent as the growth target for the forthcoming year. On the other hand, every effort will be made to exceed this rate when circumstances are particularly favourable.

Finally, from the methodological standpoint, the global or partial models studied in connexion with the preparation of the Plan can be used during the first phase of the construction of the economic budgets.¹⁹

The economic budgets are considered every year by the National Accounts Commission, the secretariat services of which are provided by the Economic and Financial Research Service of the Ministry of Finance.

(b) *The Higher Council of the Plan*

This consultative agency, whose role was set forth in chapter III, will meet once or twice a year to watch the implementation of the Plan and propose whatever measures circumstances may call for.

(c) *The Modernization Commissions*

The Government is empowered to convene certain Modernization Commissions every year in order to study the progress of this or that branch of the economy.

(d) *The National Budget*

As previously shown, the Budget Department is closely associated with the formulation of the Plan. It has had the opportunity of gaining an approximate idea of what a national budget compatible with the implementation of the Plan should be in 1965, and is therefore in a position to gear the annual budget to the attainment of the budget estimated for that year.

It was thus, for instance, that the 1963 budget was prepared. A circular issued by the Ministry of Finance on 9 March 1962 formally instructs the various Ministers to prepare their requests for appropriations, especially for investment appropriations, with reference to the Plan projections.

(e) *Specific Problems*

Special mention must be made of certain questions

whose significance in relation to the avoidance of specific risks of disequilibria has been amply demonstrated by past experience.

(i) *Adjustment of wage movements to the tempo of implementation of the Plan.* The share of wages in total household income (about 60 per cent) makes them extremely important for the balanced implementation of the Plan. If wages increase more slowly than is contemplated, there is a risk that aggregate demand may not be sufficient to bring about the desired expansion. If they rise too fast, the danger of inflation appears. The limits beyond which the risk of disequilibrium arises depend upon factors that are sometimes difficult to evaluate, notably the employment situation, the state of the harvest, the balance of payments, and available production capacity.

Spontaneous wage movements tend to follow a course exactly contrary to that required for the maintenance of equilibrium. When there is full employment, for example, the high-productivity sectors raise salaries and wages rapidly in order to secure the manpower they need, and, in view of the fact that there is only one labour market, the sectors where productivity rises more slowly are compelled to follow suit, but their prices are forced up.

Hitherto, the policy of the authorities with respect to wage controls has consisted, as in all countries where no national wage policy exists, in spurring on aggregate demand at times when it has been slack and curbing it when it has tended to become over-buoyant. In the case of the Fourth Plan an experiment is to be tried out with the aim of establishing a link between decentralized wage discussion procedures and the implementation of the Plan.

Moreover, this problem of wage trends has to be fitted into the framework of an income policy. The Government does not intend to pursue such a policy by means of new legislative or regulatory provisions likely to trammel the free bargaining power of collective bodies. It hopes that better information services, a growing awareness of the interdependence of events and the consciousness of how much is at stake will gradually extract from the realities of life itself the elements of an income policy.

Only the future can tell whether this hope of a smooth upward trend in wages, permitting price stability, will be spontaneously fulfilled, or whether new forms of intervention will prove necessary.

(ii) *Stabilization of agricultural prices.* At the present time, a public establishment known as the *Fonds d'Orientation et de Régularisation des Marchés Agricoles* (FOR-MA) is responsible for applying the Government's policy in respect of agricultural prices of the promotion of exports. It influences the market either directly or through the appropriate regulatory associations (as in the case of meat and milk). In the future it will probably have the backing of professional associations or groups set up with a view to the export trade or to the concentration of transforming and stocking facilities on the domestic market.

Again, studies are being carried out with the aim of defining a rational conception of building up inventories and as economic as possible a way to install the means of doing so (especially refrigeration facilities), so that the unevenness of the flow of production within the course of the year can be minimized and a buffer provided against annual fluctuations.

¹⁹ See J. Mayer, "Réponses à quelques questions sur les budgets économiques", *Etudes de comptabilité nationale*, No. 2, Imprimerie Nationale, Paris, 1961 (22).

(f) *Foreign trade prospects*

One of the paradoxical aspects of the Fourth Plan is that it contemplates a substantial expansion of France's foreign trade without the means of knowing whether the prospects outlined are compatible with those of the country's leading partners. Most of these have in fact not defined their medium-term targets. This paradox is particularly marked in relation to the European Economic Community. The Rome Treaty establishes the principle of co-ordination of economic and monetary policies, but does not carry it as far as the idea of common policy.

Within the framework of the Community, France is making every endeavour to increase the number of meetings held for the purposes of exchanging information, but the fact remains that unilateral decisions on the part of any individual member of the Common Market may exert a perceptible influence on the implementation of the Plan in this or that sector, or on its over-all equilibrium.

3. SPECIFIC INSTRUMENTS

The purpose of these instruments is to encourage investment and channel it in the directions calculated to further the aims of the Plan. They afford the Government valuable media for putting the Plan into effect. In most instances, the authorities act through the Commissioner-General for the Plan, whose headquarters are the agencies described below and whose opinion is requested in relation to all long-term decisions.

(a) *Channelling of investment directly controlled by the State*

The investments effected by the public sector or directly controlled by the State actually constitute about 50 per cent of total annual investment in France. The problem in this connexion is to ensure their co-ordination and continuity.

(i) *Co-ordination.* Every year, the Office of the Commissioner-General for the Plan is consulted by the Budget Department with respect to the allocation of appropriations for equipment. It also works in permanent contact with the Investment Office of the Budget Department.

The aim pursued by the establishment in 1955 of the Economic and Social Development Fund, its Governing Council and its specialized committees (Decrees dated 18 and 30 June 1955) was to co-ordinate the action of the various services concerned with the management of the Treasury's investment resources.

The responsibility for administering the resources of the Economic and Social Development Fund lies in the hands of a Governing Council comprising the Ministers upon whom the investments effected depend; the Directors of the Budget, Treasury and Prices, Departments; the Directors of the Bank of France and of the four big public savings and credit banks; and, finally, the Commissioner-General for the Plan.

In practice, the work relating to the current operations of the Economic and Social Development Fund is carried out by several specialized committees on which the Commissioner-General for the Plan is represented.

(ii) *Continuity.* Public investment must also be co-ordinated in a chronological sense. If an executive department is to be able to implement its investment program-

me satisfactorily, the latter should be fixed in the light of the appropriations that will be allocated to it in the course of the next few years. What is more, such a projection is very useful for the industrialists who are called upon to put into effect the programme contemplated. Lastly, since public funds are inevitably tight in face of limitless requirements, a system of staggering estimated equipment expenditure will make for a more rational distribution, a more equitable sharing out of appropriations among the various recipients.

As a means of coping with the problem of continuity, a budgetary procedure based on a "Programme Act" was instituted, although its application still involves some degree of ambiguity; the appropriations envisaged for subsequent years have in fact to be ratified by the annual Budget Act. The importance of continuity in the public investment effort becomes increasingly apparent as the non-profit sector acquires more knowledge of the economic repercussions of the markets. Studies at present being carried out by the Central Markets Commission will enable significant improvements to be suggested in this field.

In conclusion, it must be pointed out that the Urban Equipment Commission of the Fourth Plan has taken pains to secure more efficient co-ordination of public investment — by the State and by communities — at the local level. This co-ordination is of great importance in preventing waste of equipment resources; furthermore, it falls within the scope of regional policy.

(b) *Incentives and guidance for private investment*

(1) General investment incentives are provided in France, either by way of fiscal measures (taxation on value added, practice of tapering depreciation, etc.), or by promoting the reduction of long-term rates of interest and facilitating access to credit. The procedure of group loans to medium-sized enterprises through regional development associations opens up wider possibilities of access to the securities market. The National Credit Bank, whose assistance is intended primarily for enterprises to which the money market would not be readily accessible, makes every effort to ease the security requirements demanded of borrowers.

(2) The channelling of investment is effected less and less by means of the physical controls that were applied during the years immediately following the War. Virtually the only physical control procedure still adopted is that of building permits. It is used particularly to act as a brake on excessive development in the Greater Paris area.

(3) The authorities have other means of exerting pressure at their disposal. In some economic sectors these are extremely powerful. The State is in effect the leading purchaser for certain industries (electronics, heavy electrical material, public works, etc.). It could take advantage of this to divert the activity of enterprises into the channels required by the Plan. But in fact, much still remains to be done in respect of market rationalization. The importance of this economic lever is underestimated, and, in consequence, it is too often misused, or its pressure is exerted in a direction other than that desired by the authorities responsible for the balanced development of the French economy. The Government still has a say in the fixing of prices of certain basic products (aluminium, fertilizers, etc.) and public utility tariff rates.

(4) Lastly, the State can apply a considerable number of selective financing or fiscal policy procedures with a view to the flexible channelling of private investment. Control of the sources of external financing of enterprises enables the Office of the Commissioner-General for the Plan to express an opinion in connexion with the economic study of the principal financing records of enterprises applying either for a long-term credit or for authorization to issue bonds, or, more simply, increasing their capital.

(i) *Long-term and medium-term credit records.* In France medium-term credit (two to five years) and long-term credit (five to twenty years) is supervised in practice by the *Crédit National*, a private bank operating under State control. In conformity with unofficial agreements, the *Crédit National* submits to the consideration of the Plan authorities medium-term portfolios whose amount exceeds 1 million new francs, and long-term portfolios in excess of 2.5 million new francs.

(ii) *Issue of bonds.* The Ministry of Finance (Treasury Department) has to authorize all issues of bonds amounting to more than 1 million new francs. The Treasury consults the Plan authorities on the programme of the enterprises applying for such authorization prior to granting it and to making the appropriate entries in the register of bond issues.

(iii) *Increase of share capital.* An Act dating from 1957 institutes the following provisions: for amounts representing up to 5 per cent of cash contributions on the occasion of an increase in its capital, a company whose shares are quoted on the Stock Exchange can distribute annual dividends to its shareholders free of corporation taxes, over a period of seven financial years, providing that its programme is recognized as being in line with the objectives of the Plan. In practice, every company that increases its capital requests the approval of a special committee which considers its programme in relation to the Plan targets. In actual fact, consultation with the Office of the Commissioner-General of the Plan is effected by recourse to records, but also through personal interviews with industrialists, with whom outlets, selection of areas of projected investment, the amount of exports or of import savings, etc., are discussed. The Office of the Commissioner for the Plan is anxious that there should

be give-and-take in these matters, and its attitude is generally regarded as quite flexible.

(5) In the fiscal sphere, there are procedures for granting exemptions by mutual accord in relation to a degree of economic interest which is evaluated in each individual case. These include, for example, measures to reduce property transfer taxes or licences in cases where the aim is more efficient distribution of land (industrial decentralization) or the encouragement of scientific and technical research.

(6) Most of these selective measures have been established little by little, in experimental fashion. An effort has been made to extend and systematize them through the idea of the "quasi-contract". A branch of economic activity, or a specific enterprise, reviews, in consultation with the government department concerned, the targets it proposes to attain within the framework of the Plan; it pledges itself to devote its maximum effort to reaching them, against a promise on the part of the authorities to give it priority in respect of certain benefits. In 1957, a "quasi-contract" was concluded between the motor vehicle industry and the Minister of Finance, under the terms of which two-thirds of any additional output in relation to a benchmark period was to be reserved for export; it proved exceptionally effective, since the export turnover of this branch of activity rose in three years from less than 10 per cent to 50 per cent of the total.

At the present time, "quasi-contracts" are in process of application in the industries manufacturing capital goods and the food processing industries.

Finally, there is a possibility that in certain sectors and for certain areas the State may be induced to resort to public enterprise, which, of course, does not preclude co-operation with private enterprise. The suggestion has been put forward that an experiment of this type might be carried out in a somewhat under-developed sector of the French economy, like the machine-tools industry, or in an area requiring to be developed, such as Brittany. Recently, a sort of "brains trust" has even been introduced, with the creation of SODIC — an agency affiliated to four big public savings and credit banks — to serve as a research body to investigate questions of industrial conversion and decentralization.

VII. ATTEMPT AT A CRITICAL APPRAISAL

1. INTRODUCTION

French planning is far from being beyond reproach. Even in France it has been widely criticized, particularly at the time when the Fourth Plan was being prepared and discussed. Before setting forth very briefly the main points that are open to criticism, two preliminary comments should be made:

(a) French planning has made great strides during its fifteen years of existence. One sign of this is the change in the title of the Fourth Plan. Its title is the Economic and Social Development Plan whereas its predecessors were called Plans for Modernization and Equipment. Planning will no doubt continue to develop in this direction in the future. The experience acquired during the preparation of the Fourth Plan has made it possible to embark upon a study of ways and means of improving

the methods that are likely to be used for the preparation of the Fifth Plan.²⁰

(b) French planning has always been highly empirical and has taken into account the economic and social context in which it has to be applied. The technical methods adopted for it are determined by the institutional and political framework in which they are employed. However, there seem to be legitimate grounds for distinguishing in a critical review between technical shortcomings and institutional problems. The latter revolve essentially around the democratic nature of the Plan.

Special reference should be made to foreign trade projections, which raise both technical problems and

²⁰ The Fifth Plan is due to enter into operation at the beginning of 1966. The actual preparation of the Plan is scheduled to begin towards the end of 1962.

problems of international policy, and lastly, a fundamental question must be asked which goes beyond the bounds of French planning: what are the possibilities and significance of planning in an economy in which private enterprise and the play of market forces have an important part?

2. TECHNICAL SHORTCOMINGS

A certain amount of criticism has been levelled at the methods used in the preparation of the Plan. The main attack has been directed at the planners' failure to set forth the different alternatives clearly enough so as to give the political agencies a complete grasp of the choice they have to make.

As actually formulated, the Plan offers a feasible scheme for development up to 1965, but it is not necessarily the best one. Great care has been taken to see that the Plan presents a balance of factors; but it has not been possible to pay equal attention to ensuring that it represents the optimum.

The method of successive approximations does, of course, enable a large body of information to be gathered together and draws different groups into the work of preparing the Plan, but its application is vague and the results obtained are equivocal. This criticism is sometimes expressed in a more technical way by saying that the Plan should be formally expressed as an over-all model clearly bringing out the ratios between the different parameters.

Objections have also been made to the fact that the Plan did not explain the nature of the relationship between the objectives proposed and the measures required for their attainment. Criticisms have also been directed at particular aspects such as the lack of a systematic relationship between production, productivity and coefficients of capital branch by branch; the unreliability of projections based on constant prices; the lack of financing studies by branches, and the weaknesses of regional planning.

By and large, these criticisms are justified. The planners are fully alive to the technical shortcomings of French planning methods at their present stage of development. A number of studies are being carried out in an attempt to remedy defects at least to some extent by the time the Fifth Plan has to be prepared.

(a) *The study of variants and a definition of the optimum*

When the Fifth Plan is prepared, an endeavour will be made to throw more light on the basic alternatives placed before the political bodies and on their relationship with the measures envisaged for applying them. It is unlikely, however, that the whole Plan can be expressed in terms of a completely crystallized model. The prevailing tendency would appear to be to make a flexible central profile around which a systematic exploration of marginal variants can be undertaken. In this way, some use can be made of the technical resources of linear programming while the method of successive approximations can still be applied for the central profile of the Plan.

These studies should be preceded by the fullest possible survey of the different types of variants. What must be done, in fact, is to explore not only the variants offering alternative targets but also those that make allowance for the uncertainty which surrounds the different coefficients (technical coefficients, coefficients of capital, consumption elasticity, propensity to import, etc.), and for the risks inherent in the general hypotheses of the Plan.

These studies of variants are also connected with other studies and with the improvement of the statistical instruments available, namely

(i) Detailed monographs, by branches, to provide a fuller knowledge of the different techniques and link up production, productivity and capital coefficients. The production of more of these individual studies would still not solve the difficult problems of aggregation inherent in transferring results obtained on the micro-economic scale to a macro-economic structure.

(ii) Improvement of statistics on income distribution. Information on this subject is very inadequate in France, and must be substantially improved if a serious attempt is to be made to shape an income policy.

(iii) Study of the influence of prices on the relationship between branches and on over-all balance. Work should be carried on along the lines indicated by a study prepared concurrently with the Fourth Plan but never incorporated into it.²¹

(b) *The extension of forecasting*

The studies for the Fourth Plan were guided by a preliminary study referring to 1975. For the preparation of the Fifth Plan a bolder approach is needed. Accordingly, the Office of the Commissioner-General for the Plan is compiling material for a forecasting study based on 1985, which will be less an extrapolation of the past than an endeavour to select facts capable of affecting the future situation and to assess the main developments that are to be expected therefrom.

(c) *Regional planning*

As stated before, it was not possible to do more than sketch the rudiments of a policy for regional planning in the Fourth Plan. In the preparation of the Fifth Plan, consideration will have to be given to the results of the method of operational sections which is to be put into effect in the coming months.

3. THE DRAWBACK OF THE DEMOCRATIC PROCESS

This was the issue that provoked the greatest number of criticisms during the preparation and discussion of the Fourth Plan. They were concentrated to two points in particular:

(a) The limited role of Parliament, which had to take decisions on the Plan in its final form without having been able to discuss the question of choice of broad policy lines at the appropriate time;

(b) Insufficient representation of labour on the bodies responsible for preparation and consultation.

Generally speaking, in spite of the improvements made in respect of the Fourth Plan (the most important being the consultations with the Economic and Social Council during the Plan's formulation prior to the stage of actual preparation), public opinion has become increasingly aware of the importance attaching to the establishment of policy guide-lines from the very beginning and more determined that the choice of such guide-lines should be accompanied by free democratic discussion.

Technical experts have certainly played a major part

²¹ See Nataf and Tionnet, *Le modèle à moyen terme à prix variables*, SEEF, *Etudes de Comptabilité Nationale*, No. 3, 1962 (21).

so far during the whole of the first stage of preparation. But however uncommitted and objective they are, they may be tempted to introduce their own outlook into the Plan. They are the first to wish for responsible and timely decisions on the part of the representative agencies concerned.

As the term "concerted economy" has been used to describe the present state of the French economy, this image may give an impression of harmony which is wishful thinking rather than hard fact. Although two of the parties concerned, the public administration and private enterprise, do have a place in the arrangement, the third party — the trade unions — play only a minor part at the present time.

Guide-lines on the two points mentioned above have been laid down for the Fifth Plan. When the Fourth Plan was under consideration by the National Assembly, the Government specifically undertook to bring Parliament into the discussion of the preliminary alternatives for the Fifth Plan. The trade unions should undoubtedly be given a more influential part to play in the Modernization Commissions and working groups by increasing the number of representatives and making these the Chairmen or Rapporteurs on some of the Commissions. It is also undeniable that the Plan will be judged largely by the way it actually shares out the benefits of the expansion whose equitable distribution was formally proclaimed as one of the Fourth Plan's targets.

The initial hypothesis underlying the work of the Fourth Plan was inclined to be conservative on this point. It envisaged the maintenance of the present structure of income distribution (receipts at all stages being multiplied by the same coefficient). It was not until later that the marginal variants designed to make a more than proportional improvement in the situation of some under-privileged categories were studied.

There is no doubt that the future of planning in France is tied up to some extent with the possibility of defining and carrying out a long-term policy on income. The authorities have expressed some highly praiseworthy intentions in this respect. The future will show whether these have remained a dead letter or whether it will be possible to put into effect a sort of "progress contract" whereby the Government, in the light of the results achieved by the Plan (which like the contract will be reviewed annually), would assure, within the limits of its competence, a certain number of commitments or even make immediate decisions relating to income, and to wages in particular.

If the process is to be truly democratic, consultative mechanisms must be set up, that are sufficiently decentralized and co-ordinated to achieve a balanced synthesis. The Plan is implicitly based on the principle that the free play of the law of supply and demand is not enough to ensure that the needs of the community will be fully satisfied. The will of the community must therefore find expression in a variety of ways so that the claims of different groups (workers, consumers, etc.) and areas of human interest (housing, recreation, culture, etc.) can all be taken into account.

At the present time, there is a fairly large variety of consultative instruments: Modernization Commissions, working groups, the Economic and Social Council, the Higher Council of the Plan, etc. It is not yet quite clear what role each one is to play, and their activities have not yet been properly-co-ordinated. Through the super-

vision of the Plan's implementation, it should be possible to find in practice a way of co-ordinating the different agencies.

One of the salient problems presented by any kind of planning that aims at being democratic is the co-ordination of technical work and political decisions. The difficulty of the problem is enhanced by the fact that discussions are more comprehensive and the process of consultation more complex. Co-ordination of this kind calls for strict discipline in the execution of operations and a well-planned time-table. Above all it assumes that the technical experts and the nation's representatives have been able to find a common language. This cannot be done unless accurate economic information is disseminated widely enough to ensure that all the consultative and policy-making agencies are aware of the demands of consistency and of the limitations set by the actual economic situation.

For a genuinely democratic planning process to take place, the question must first have been posed as to what the Plan is designed to achieve. This question far overlaps the bounds of planning, since it raises the question whether a common purpose can be achieved by the society concerned. This issue will be dealt with briefly further on.

4. THE LIMITS OF PLANNING IN A SINGLE COUNTRY

The treatment of foreign trade in the French Plan is still very rudimentary. This is undoubtedly a weak point which is all the more regrettable in that France is engaged in opening up its frontiers and hence increasing the contribution of the foreign trade sector to its gross national product. The inadequacy of the treatment is attributable to both technical and general reasons.

There is undoubtedly a lack of serious studies at the present time on the evolution of foreign trade. It is essential to be able to draw upon historical analyses linking up trade flows with the development of the different regions of the world. This would be the first step towards the formulation of sounder projections. The task of making such studies would involve a great deal of work since a large number of commodity groups in the principal regions of the world would have to be analyzed in detail.

But even if far more reliable technical studies than those prepared in the past were available, other obstacles would soon be encountered. What are needed are reasoned forecasts of economic development in other countries for both domestic production and foreign trade trends. As already indicated, the information currently available on the economic development prospects of the different countries is still very rudimentary, even within the limited confines of the European Economic Community. Hence it is hardly to be expected that consistent forecasts for the world economy as a whole should be available.

Meanwhile a country such as France, which is anxious to make a comprehensive projection of its economy, is constrained to envisage its foreign trade in strategic terms. It has to take into account the considerable hazards represented by its ignorance of its partners' intentions. Above all it is obliged to allow for a larger foreign trade surplus in the Plan than would be necessary if concerted projections had been prepared. Mr. Pierre Massé has gone so far as to say that "At the present time projections of foreign trade take their inspiration from the theory of games, in which an opponent must always be assumed".²²

²² Pierre Massé, *Situation et perspectives de la planification*

This undoubtedly means a waste of resources for the individual countries and for the world economy as a whole. An improvement in the reciprocal exchange of information would throw more light on international competition, give experts in the industrialized countries a knowledge of the motive forces involved and, above all, offer sounder prospects to countries in course of development. There is a tendency to think along these lines at present and it is to be hoped that an exchange of information and comparison of the long-term political prospects of the different countries will be undertaken on a reciprocal basis.

Some time ago, Belgium set up a Programming Office which prepares medium and long-term development plans. In Italy, Mr. La Malfa, the Budget Minister, has just confirmed his country's intention of embarking upon a process of over-all programming. A few months ago the United Kingdom created the National Economic Development Council, supplemented by the establishment of a technical agency which is not unconnected with the Office of the Commissioner-General for the French Plan.

International organizations are also engaged in working out long-term prospects. In November 1961 the first OECD Council of Ministers fixed an over-all target of a 50 per cent increase in growth for the twenty member countries during the decade 1960-70. A long-term study is now being undertaken by the Organization to explore the practical possibilities of achieving this general objective.

Lastly, the United Nations General Assembly has decided to set up a projection and programming centre to compare long-term development prospects in the different countries and to prepare a world projection framework into which national studies could be fitted. The last-named measure would be most helpful in studying the interrelationships of the developed countries and especially the probable future relations between developed and developing countries.

5. PLANNING AND A DECENTRALIZED ECONOMY

It is difficult to avoid raising a fundamental question in the light of this analysis: can a decentralized economy of the capitalist type be planned? As it is patently impossible to give a definitive reply to this question, all that will be done is to indicate some points for further consideration.

(a) It is widely held that planning and a system of free enterprise are fundamentally a contradiction in terms. This has been asserted by both orthodox Marxists and neo-Liberals.

Planning in France has often been criticized for diametrically opposite reasons: on the one hand it is charged with hampering initiative and threatening to crush the free play of competitive forces, and on the other to be an illusory superstructure, making very few changes that would not have occurred in any case in the normal course of events.

It is tempting to counter these criticisms in a factual way by pointing to the quite remarkable growth of the French economy during the last ten years. But this reply would not be enough. In actual fact, it is very difficult to assess the role really played by the Plan in the recovery of the French economy. Moreover, it might be contended

on the other side that some countries such as the Federal Republic of Germany, where the official policy is opposed to planning, have progressed even more rapidly.

A more valid response would be to point out that the French Plan is a plan by branches and not by enterprises, apart from the exceptional case of highly concentrated branches composed of one or more units each (electric power, steelmaking, certain chemical and engineering activities, etc.). The Plan does not intervene directly in the programme of individual enterprises. It allows each one to pursue its own activities as it thinks best, thereby preserving a considerable amount of economic competition.

The problem is thus reduced to the ability of the public authorities to assure the satisfactory implementation of the Plan by indirect means, more particularly by the fiscal and financial instruments that have already been briefly reviewed here. It may well be that these instruments will be used with increasing efficiency. This depends on the progress made by economic techniques and the skill with which they are handled in future. It also depends on the independence and power of the State.

(b) The temptation sometimes arises to describe French planning as being conceived in the indicative mood in contrast to what may be termed planning in the imperative mood, which is the type that prevails in the Eastern European countries. Put in this way, the problem seems to be badly stated. Planning has no *raison d'être* unless it purports to influence the course of events and to establish objectives different from those that would be attained through the natural evolution of the economy. Hence, it cannot be said that any type of planning is merely "indicative".

On the other hand, an entirely "imperative" type of planning, that is to say one which lays down as minutely as possible the targets for each economic unit, is impracticable. It is, in fact, tending to disappear. For instance, a significant shift has been observed to be taking place in the trend of Soviet planning for some years in the sense that efforts are being made in certain fields to replace administrative measures by indirect means of guiding the economy, to reduce the number of detailed targets, to give prices a part to play and, in certain spheres, to allow enterprises a semblance of autonomy.

All types of planning are at once imperative and indicative. Mr. Pierre Massé, the Commissioner-General for the Plan, has suggested that French planning should be defined as "active planning", thereby implying that action to ensure the implementation of the Plan should be embodied in the framework of the Plan.²³

(c) Instead of an academic discussion disguising an ill-defined factual situation, it would seem more profitable to ask the following questions: What part of the Plan represents a recognition of spontaneous trends? What place is set aside for voluntarily-defined objectives? In connexion with the second question, a subsidiary but equally important question should be raised: Whose views (those of what person, group or agency) have been taken into account in the arbitrament decision?

These questions should be posed, not for the Plan as a whole, but for each of its sectors and, as far as possible, for each of the basic decisions and each of the figures included in the final synthesis. Some examples can be quoted in connexion with the Fourth Plan. For instance,

²³ Pierre Massé, *Situation et perspectives de la planification française*, op. cit.

française. Paper for the consultative meeting on democratic planning, March 1962 (19).

mention has been made of the deliberate decision in favour of public investment intended to satisfy the needs of the community, and among these the priority given to schools. There were also the arbitrations on the importation of textiles, automobile production targets, etc.

It is extremely difficult to make a comprehensive and detailed analysis of this kind for each of the figures included in the Plan. The real decisions are taken in the course of a complex of discussions, pressures applied, negotiations, and compromises involving numerous decision-taking agencies. A complete and objective body of information on the real course of events leading up to a particular decision is very difficult to compile. What is more, this process brings into play various social forces and strategies that are complicated and often in flux. Their effects have to be interpreted, and this is where individual views on the country's economic and social situation can play a part.

(d) It has sometimes been remarked with critical intent that French planning is ambiguous. This ambiguity is obvious; it is the reflection of French society which is undergoing a transformation. The major forces underlying this transformation are not yet clearly discernable. But the following phenomena may be recorded:

(i) A demographic surge which, in a few years time, will bring to adulthood a new cohort born just after the end of the war, the trends of which are still little known;

(ii) The rapid transition to a consumer society with its attendant repercussions on ways of life and on social and political ideas;

(iii) The change in political conditions, which makes it hard to distinguish between temporary phenomena and more fundamental trends;

(iv) The new outlook of heads of enterprises, particularly those representing the major economic forces, whether private or public;

(v) The tendency of the French civil service (especially its higher technical and economic staff) to regard itself as an autonomous and conscious force distinct from private profit-making concerns and purely political organs. This tendency has sometimes been described as technocratic.

All these factors are reflected in the Plan, whose preparation offers an ideal milieu for the play of the different social forces. On the other hand, the existence of the Plan has had some effect on the behaviour of these forces. It has already been mentioned, for instance, that the Plan has modified the behaviour of groups in the non-

profit sector, such as the Budget and Treasury Departments, and has influenced the outlook of private industries. Many of the latter now look upon the plan as a natural framework for their own activities.²⁴

(e) No plan can remove antagonistic forces if such exist in the type of society under consideration. It is not a magic wand for unifying a divided society.

It is not the place of the expert to judge whether a given society is sufficiently unified to be able consciously to achieve a common long-term goal, and whether its internal conflicts are of minor importance in comparison with its ability, as a community, to realize where it is going. In other words, it is not to the expert to determine whether the nation's political organs really represent a common will shared by a sufficiently large majority.

Assuming that this fundamental requisite has been complied with, the Plan may be regarded as an extremely efficacious instrument for fulfilling these common aspirations. It is to be hoped that the future progress of planning techniques, which are still in their infancy, will one day enable the community to translate its vision of the future into more precise and rational forecasting operations.

Market forces will then no longer operate blindly as they used to do when the economy was at a very elementary stage of development. Enlightenment will come in the form of advances in the techniques for forecasting and consciously directing the economy.

Planning would thus be one of the fundamental conditions — not an adequate condition but an essential one — for the exercise of true democracy.

Lastly, the existence of French Planning seems to indicate that even in a divided society, if planning is unable to eliminate internal conflicts it can at least make the protagonists more aware of the issues involved. Some way of settling them can then be sought in the light of a better understanding among the parties concerned of the current economic situation and of the possibilities opening up for the future. It is to be hoped that the effects of this tendency will be to make the conflicts more realistic and to focus them upon the specific choice between different development alternatives rather than on antagonisms of an emotional or ideological kind.

²⁴ A small but significant example concerns the French branch of a big international company; the Shell-Berre Corporation has just published for the information of its own staff a widely-circulated pamphlet entitled "*Qu'est-ce que le IVème Plan?*" (24).

VIII. CONCLUSIONS

French planning is enjoying a vogue today. It is in vogue even in France itself. The criticism evoked during the preparation and discussion of the Fourth Plan were chiefly directed at government policy. Even the most determined opponents of that policy could not refrain from paying a passing tribute to the value of the techniques and the ability of the planners who used them. It is also in vogue abroad. For some months past articles on the Fourth Plan have been appearing increasingly in the world Press. It has become fashionable for foreign economists and government officials to visit Paris to obtain first-hand information.

It is not without some misgivings that French planners have watched the Plan blossom forth into international stardom. They know that they have devised a useful instrument, but they are the first to realize its limitations and shortcomings. They fear that a rather too uncritical enthusiasm may be followed by disappointment. What is more, they are well aware of the fact that these planning techniques were conceived and developed in a particular context and that it would be fruitless to try to apply them just as they are in a different environment.

If they are willing to describe these techniques in some detail and with, it may be suspected, some self-

satisfaction, it is because they hope that an accurate account which makes no attempt to gloss over the deficiencies will bring the legend into proper forms. They trust that the reader will obtain some benefit therefrom. The main benefit, in their opinion, does not lie in the originality of their methods. There is nothing particularly remarkable about the technical process itself, which is very simple in theory and difficult in practice, and is chiefly notable for a few innovations in matters of detail. There is no sensational and universally applicable panacea to be found in French planning. The planners do believe, however, that some profit can be obtained from reflecting on some of the Plan's fundamental features and that such reflections may provide some assistance to experts in very different circumstances and conditions.

The characteristic feature of French planning is its empirical nature. It has long been without theoretical premises; in fact, it is only now, after fifteen years of practical application, that the first hesitant attempts are being made to adumbrate them. This empiricism is seen in the constant efforts at adjustment to the economic and social background. In practice, French planning is becoming more and more closely linked to government activity. It endeavours to emphasize its operational nature by linking up with each specific target to the measures to be adopted for its implementation.

French planning is based on widespread co-operation. A fairly impressive number of representatives of different social groups were associated with the preparation of the Fourth Plan. This co-operation involves a complex and often confusing process, and the results are ambiguous. But, although it is too much to say that it succeeded in disarming all opposition, there are grounds for arguing that it has created a fairly wide area of agreement around the Plan which greatly facilitates its execution.

In short the chief merit of French planning is that it exists, and constitutes a new venture which is virtually the only one of its kind at the present time.

As the introduction to the parliamentary bill proposing the Fourth Plan states "The Plan thus enters a field which has hitherto been excluded from the definition of over-all policy in the Western countries. It endeavours to resolve the apparent contradiction between freedom and discipline, in spite of the undeniable fact that the measure of each varies according to the prevailing circumstances. The stakes are high: they are the expansion of security and social justice".²⁵

This experiment is taking place in an industrialized economy with a complex structure, and in the midst of a society that is rapidly evolving, but so far it has not demanded any radical change in institutions. It has been successful in obtaining certain results in a particular set of circumstances, while preserving a character which is described in some quarters as technocratic.

The problems to be solved are obviously quite different in countries where development calls for much more radical changes, where questions of long-term equilibrium are perhaps less important than the clarification of the vital and fundamental choice to be made between widely divergent ways of development, and where the statistical and accounting methods are not the same as those used in France. Nevertheless, it might be useful even in an entirely different set of conditions to study the way in which French planning has been established and developed in its own context. This may not provide the reader with solutions that are immediately applicable, but it may give him a clearer understanding of the problems of his own country.

²⁵ *Project de Loi portant approbation du Plan de développement économique et social*, National Assembly (1).

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ECONOMIC CALCULATION METHODS USED IN THE PREPARATION OF THE SPECIFIC PROJECTS

The French Plan is, as stated before, a plan drawn up by branches and not by enterprises. In the majority of cases, it does not take into consideration the specific projects of individual enterprises.

However, some branches are important enough for their particular projects to have a direct bearing on the over-all balance. Hence it is important to obtain some knowledge of the methods used for calculating investment in those branches. In actual fact, even in such cases, the Commissions themselves are not directly concerned with investment decisions, which are made at the level of the enterprises.

As a general rule, the calculations on which the specific programmes are based are made by the method of maximizing brought up to date returns. In a certain number of cases the techniques of linear programming, either with or without the element of uncertainty, may be used.

The problems of investment selection are discussed at length in the basic reference work by Mr. Pierre Massé, *"Le choix des investissements"* (Dunod, Paris 1959).

The work by Mr. J. Lesourne: *"Techniques économiques et gestion industrielle"* (Dunod, Paris 1958) will also be found useful.

For the application of these methods in the different branches of industry the following publications may be consulted:

Electric power production

Marcel Boiteux and Francis Bessière, *Sur l'emploi des méthodes globale et marginale dans le choix des investissements*;

Marcel Boiteux, *"Le choix des équipements de production d'énergie électrique"*, *Révue de Recherche Opérationnelle*, volume 1, No. 1.

Electricité de France: *L'étude à long terme des plans d'investissement à l'aide de la programmation linéaire*. EDF, *Etudes Economiques Générales*.

Transport

Pierre Mallet, *"Problèmes d'optimum dans le secteur des transports"*, *Etudes de Comptabilité Nationale* No. 3, 1962.

Centre de Recherches Mathématiques pour la Planification (CERMAP): *Note sur la formalisation des choix d'investissement et d'exploitation dans le secteur des transports*, June 1962.

Petroleum products

Ministère de l'Industrie et du Commerce (Direction des Carburants) and Société d'Etudes Pratiques de Recherche Opérationnelle: *Etude de la structure optimale de l'industrie du raffinage et des transports de produits pétroliers*. *Annales des Mines*, November 1958.

GEOGRAPHIC DISTRIBUTION OF THE POPULATION OF LATIN AMERICA AND REGIONAL DEVELOPMENT PRIORITIES

INTRODUCTION

It is well known that the population of Latin America is now growing more rapidly than that of any other large region at any time in history. The result of censuses taken since 1960 indicate that earlier estimates of an average rate of growth of 2.6 per cent per year were too low; it now appears more realistic to assess the present rate at 2.9 per cent and to expect this rate to rise above 3.0 per cent during the 1960's.¹ Only two of the twenty republics (Argentina and Uruguay) have rates of increase below 2.0 per cent per year, while four others (Bolivia, Cuba, Chile and Haiti) have rates below 2.5 per cent. In some of the Middle American and Caribbean countries the population is now rising by about 3.5 per cent annually.

The socio-economic implications of such high rates of growth have been considered in earlier studies made by the secretariat of the Economic Commission for Latin America.² It is obvious that the higher the rate of growth of population the higher the proportion of current income that must be devoted to investment if the increasing numbers of human beings are to maintain a constant level of living. The high rate of dependent children to persons of working age in a fast growing population and the associated need for heavy expenditure on education have also been discussed.

The inferences, however, have been drawn at such a level of abstraction that their utility for economic and social development strategy is limited. Detailed inference, for purposes of policy guidance, becomes possible only as a result of detailed study. Understanding is needed of the manner in which population growth is distributed over the face of the land; the extent of relocation of the increasing numbers among cities, towns, villages and dispersed dwellings; and the nature of changes in the social, educational, and occupational composition of the populations of specific regions and types of localities.

¹ For estimates based on data available in 1960 see "The Demographic Situation in Latin America", *Economic Bulletin for Latin America*, Vol. VI, No. 2, Santiago, Chile, October 1961. For the more recent data see Statistical Supplement of the *Economic Bulletin for Latin America*, 1962.

² See in particular "The Demographic Situation in Latin America", *op. cit.*, pp. 22-24 and 35-37 and *Análisis demográfico de la situación educativa en América Latina* (UNESCO/ED/CEDES/8; ST/ECLA/CONF.10/L.8; PAU/SEC/8).

If part of a country has a low capacity to absorb additional population, a high rate of national population growth inevitably entails a disproportionately rapid accumulation of inhabitants in other parts. If educational or other bottlenecks hinder the formation of manpower of certain categories or levels of skills, manpower of lower qualifications will accumulate the more rapidly. If the planning of development is to be really comprehensive and effective it cannot ignore the relationships of population redistribution trends to the geographical placing of investments and the types of manpower called for by these investments. Once national policy makers have at their disposal detailed information on demographic trends they can decide whether specific measures are desirable or practicable to promote some trends or to counteract others. Alternatively, if they find little scope for influencing the demographic trends themselves, their overall development policies may have to be reshaped to bring them into line with inevitable population shifts.

The present paper summarizes the preliminary findings of a study undertaken by the ECLA secretariat into the geographical distribution of population in Latin America. In its earlier stages this study has concentrated upon the analysis of demographic data. It is clear, however, that the needed policy guidance cannot be derived from demographic data alone, even if these were more reliable, comparable and up-to-date than is the case at present. An exploration is required of the functions and inter-relationships of localities of different types, from the national capital to the rural hamlet, leading to a consideration of their present strengths and shortcomings in the Latin American setting and of ways in which they might be helped to perform their functions more adequately, thus, *inter alia*, promoting a better-balanced distribution of the population. Such a study requires the co-operation of economists, regional planners, public administration specialists and human geographers as well as demographers. It also requires information based on local monographic studies of which few examples can be found in Latin America as yet. In its present stage, therefore, the study can do no more than set forth the demographic problem, suggest some very tentative hypotheses and policy alternatives, and propose future lines of research.

I. RATE OF GROWTH AND REDISTRIBUTION OF POPULATION; A CALCULATING EXAMPLE

A simplifying model approximating to the trends now present in Latin America may throw into sharper relief the implications of differing rates of population growth for geographical and occupational redistribution.

The following calculations assume, first, that the population will continue to grow at present rates, ranging from about 2.0 per cent to 3.5 per cent in different countries.

This assumption somewhat understates the present growth trend in Latin America, since birth rates show no significant changes while death rates are likely to decline further. In the longer run, the forms of population redistribution may themselves affect national rates of growth, but such effects are likely to be of a secondary order of magnitude, are not well enough understood for assess-

ment, and need not be taken into account in the present argument.

The second assumption is that net rates of population increase in rural areas will be relatively low and inflexible. In fact, the rates of rural population increase in most Latin American countries in recent years seem to have undergone little change, in spite of the marked acceleration in over-all growth; except in some of the small Central American and Caribbean countries, the rural rate of growth now ranges downward from about 1.5 per cent in such countries as Brazil, Mexico and Peru to small net losses in Chile and Venezuela. The experience of countries farther along the road of economic development, and the continuing diffusion of labour-saving technological innovations in agriculture suggest that the rural areas are not likely to absorb population increases at a higher rate than the present, though tenure reforms and the opening of new areas to settlement may make a difference. However this may be, the following calculations assume that the rural population will continue to grow at a fixed rate of 1.5 per cent, irrespective of whether the national rate is 2.0, 2.5, 3.0, or 3.5 per cent.

In a hypothetical country with an initial population of 10 million — 3 million urban, 7 million rural — the above alternative rates of national population growth would give the following totals in the course of thirty years (in thousands):

Year	Total population, assuming various annual percentage rates of increase				Rural population, increasing uniformly at 1.5 per cent a year
	2.0	2.5	3.0	3.5	
0	10 000	10 000	10 000	10 000	7 000
5	11 041	11 314	11 593	11 877	7 541
10	12 190	12 801	13 439	14 106	8 124
15	13 459	14 483	15 580	16 753	8 752
20	14 859	16 386	18 061	19 898	9 428
25	16 406	18 539	20 938	23 632	10 157
30	18 114	20 976	24 273	28 068	10 942

By subtracting the rural from the total population, the urban population can be calculated to grow as follows, according to the several assumptions:

Year	Urban population, assuming various percentages rates of increase in total population				Urban per 100 of total population according to assumptions (percentage)			
	2.0	2.5	3.0	3.5	2.0	2.5	3.0	3.5
0	3 000	3 000	3 000	3 000	30	30	30	30
5	3 500	3 773	4 052	4 336	32	33	35	37
10	4 066	4 677	5 315	5 982	33	37	40	42
15	4 707	5 731	6 828	8 001	35	40	44	48
20	5 431	6 958	8 633	10 470	37	42	48	53
25	6 249	8 382	10 781	13 475	38	45	51	57
30	7 174	10 034	13 331	17 126	40	48	55	61

Under the "rigid" assumption that the net rural population increase will be limited to 1.5 per cent per year, the high and low assumptions for national population increase produce an enormous difference in rapidity of urbanization. At a 2.0 per cent over-all rate of growth, the urban population may double in 23 years, at 3.0 per cent in about 13 years, at still higher rates within a decade. Such unprecedentedly high rates of urban

growth have, in fact, been recorded recently in some countries of Latin America.

The apparent inability of the rural environment to absorb population growth above a "rigid" low rate, however, is paralleled by another kind of rigidity in the cities, where the rate at which industries and other forms of productive employment can expand is limited by the availability of investment funds, the size of the market, and the character of the labour force. A very rapid increase in the number of persons seeking urban employment, particularly if their levels of education and skills are too low to permit ready integration with the urban employment structure, implies that many of them will have to fall back either on little-capitalized traditional ways of livelihood or on intermittent and insecure activities affording incomes so low as to place them in an economically and socially marginal category. It is well known that this is occurring on a large scale in the Latin American cities.

Calculations similar to those already made can illustrate the relationship of rate of national population growth to the size of this urban marginal population. Let it be assumed that of an initial urban population of 3 million, 2 million depend on relatively remunerative occupations, whereas one million are in the occupationally marginal category. Let it also be assumed that remunerative employment can expand at a rate of 5 per cent per year. Under these simplified assumptions, differing rates of over-all population growth would lead to the following differential increases in the size of the marginal group (See table, next page).

At a moderate rate of population growth the marginal group would disappear after about 20 years. A national growth rate of 2.5 per cent would permit its stabilization within about the same period. At higher rates of overall growth, the percentage of urban population dependent on marginal low-income occupations would continue to rise.

The assumptions behind these illustrative calculations admittedly do not do justice to the complexity of the real situation. The assumed "rigidities" in growth of rural population and in remunerative urban employment are only relative, and numerous circumstances not included in the calculations can modify the trends considerably. Whatever the qualifications, however, the formidable dimensions of the problem of finding homes and jobs for the growing urban populations of the Latin American countries emerge with sufficient clarity.

It may next be asked what rates of population growth in rural areas would be needed to keep recruitment to the urban marginal groups within dimensions permitting their complete absorption into remunerative employment at the end of, say, 30 years. Under the previous assumption of a fixed 5-per-cent annual increase in such employment in the cities, the calculations show that national population growth rates of 2.0, 2.5, 3.0, or 3.5 per cent would require rural increase at rates of 1.0, 1.9, 2.7, or 3.4 per cent respectively.

Conversely, if it is assumed that little or nothing can be done to alter the low rate of population absorption in rural areas, what would have to be the rate of expansion in urban remunerative employment in order to bring the marginal category down to zero at the end of 30 years? Calculations indicate that such employment would have to rise by 4.3, 5.5, 6.5, or 7.4 per cent, depending on which of the four rates of national population growth is selected.

Year	Urban population remuneratively employed increasing at 5.0 per cent a year	Urban population in "marginal" categories, assuming varying percentage rates of increase in national population				"Marginal" per 100 per urban population, according to varying assumptions (percentage)			
		2.0	2.5	3.0	3.5	2.0	2.5	3.0	3.5
0	2 000	1 000	1 000	1 000	1 000	33	33	33	33
5	2 553	947	1 220	1 499	1 783	27	32	37	41
10	3 258	808	1 419	2 057	2 724	20	30	39	46
15	4 158	549	1 573	2 670	3 843	12	37	39	48
20	5 307	124	1 651	3 326	5 163	2	24	39	49
25	6 773	... ^a	1 609	4 008	6 702	0	20	37	50
30	8 644	... ^a	1 390	4 687	8 482	0	14	35	50

^a By that date, on this assumption, the entire urban population would have become absorbed in the sectors depending on remunerative employments.

If absorption of the marginal population into remunerative employment is accepted as one of the goals of national development policy, the policy-makers must find means either of raising the absorptive capacity of the rural areas or the rate of expansion of urban employment, or both, with the magnitude of the effort required rising sharply with the national rate of population increase.

In practice, of course, the problem does not present itself in so simple a form. An increase in the rural population — if it is to amount to more than a damming-up of the marginal population in rural rather than urban under-employment — may be less a question of the absorptive capacity of the present rural areas than of large-scale population shifts into areas now under-utilized. The urban population increase may be distributed in many different ways among small towns, medium-sized cities, and metropolitan agglomerations, with different implications for investment requirements both in production equipment and in the urban infrastructure. At the same time, the relative advantages and feasibility of alternative policies intended to influence population distribution will depend very largely on the aspirations, social characteristics, occupational qualifications and educational levels of the populations in question.

Before considering these questions in more detail, let us return to the calculating example in order to indicate the dimensions of rural-urban migration under the previous assumptions. The following calculation also assumes, for the sake of simplification, that rates of natural population increase (i.e. births minus deaths) are the same in urban and rural areas and among migrants and non-migrants. Actually, urban birth rates are apt to be lower than rural, although the birth rates of migrants to the towns may be higher — depending on the composition of the migratory stream — than those of non-migrants. If such refinements are ignored, the following net movements (i.e. rural-urban movements minus urban-rural movements) are involved:

Period (years)	Net balances of rural-urban migration per five-year period, with assumed percentage rates of natural increase			
	2.0	2.5	3.0	3.5
0-5	182	364	546	728
5-10	196	392	588	784
10-15	211	422	633	844
15-20	227	454	681	908
20-25	245	490	735	980
25-30	264	528	792	1 056
Sum 0-30	1 325	2 650	3 975	5 300

The total contribution of rural migrants to the urban

population can be very high. In relation to the total urban population at the end of 30 years, migrants and their offspring — i.e., those who arrived or were born in the towns from the year 0 onward, excluding migrants who may have died — would amount to 24, 37, 45, or 51 per cent, according to the assumed national rates of increase. Thus, under the last of the four assumptions, although the natural increase of the urban population is very high, its size at the end of 30 years would be only half as large were it not for migrants and their offspring.

It would be an obvious over-simplification to equate the migrants with the marginal sectors described above. In practice, part of the migrants might be found more vigorous in seeking new opportunities and more adaptable occupationally than older marginal groups confirmed in apathetic poverty. Educational and other handicaps may impede the absorption of the marginal groups even if migration is limited and job opportunities for persons at least tolerable qualified are plentiful. Even in the most prosperous societies marginal groups are known to persist. Nevertheless, where the rate of rural-urban migration is high, most of the migrants will be at some disadvantage in adjusting to urban life. The larger the urban groups already unable to find remunerative employment and the more rapidly these groups are increasing, the harder it will be for the migrants to find such employment and the more likely that they will remain in an economically and socially marginal position.

It may be worth while, therefore, to base a calculation

Year	Population of migratory origin absorbed in remunerative urban activities, with assumed percentage rates of growth in national total population							
	Numbers (thousands)				Percentage of population of migratory origin			
	2.0	2.5	3.0	3.5	2.0	2.5	3.0	3.5
0	0	0	0	0	0	0	0	0
5	241	159	75	— 10 ^a	20	12	5	— 1 ^a
10	601	418	226	26	43	23	10	1
15	1 121	813	484	132	67	34	15	3
20	1 851	1 391	889	338	94	46	21	6
25	2 327 ^b	2 211	1 492	663	100 ^b	58	27	9
30	2 738 ^b	3 351	2 362	1 224	100 ^b	71	34	13

^a Accidental result of the assumptions, implying that a small part of the urban non-migrant population is also displaced into the "marginal" category.

^b The assumption implies disappearance of the "marginal" groups, hence also complete absorption of the population of migratory origin.

on the assumption that it is especially the migrant population that is subject to the marginal conditions of insufficient, intermittent or unremunerative employment. Accordingly, the numbers of the marginal population, calculated above, will not be subtracted from the calculated population of migrant origin in order to determine, under the somewhat "rigid" assumption, what opportunities there may be for the migrant population to find remunerative urban employment. The foregoing numbers and percentages emerge.

II. A MULTI-DIMENSIONAL PROBLEM

Population redistribution, once one departs from rigidly simplified calculations such as those made above, reveals such intricate cause-and-effect relationships with other demographic processes and with economic and social change in general as almost to preclude lucid formulation. Nevertheless, its study is essential if satisfactory answers are to be found to some of the important practical questions arising in development policy.

Redistribution of a national population results partly from regional differences in birth rates and death rates, but mainly from inter-regional and rural-urban migration, especially when over-all rates of growth are high. Even within these purely demographic terms, the relationships are intricate since birth rates, death rates, and potential rates of migration are conditioned by the sex-age composition of the population, whereas the sex-age composition, in its turn, is the product of past tendencies in birth rates, death rates, and migration. Birth rates and death rates differ in different parts of a country also for a variety of other reasons, economic, social and cultural, and these differences, with time, may widen or narrow. The national population trend can also be affected by internal redistribution, e.g. between high birth-rate and low birth-rate areas.

The amount and direction of internal migration depends upon thousands of decisions made by individuals influenced by a wide variety of considerations. Except for persons forced out of their homes by natural catastrophes or by violence, there is always an element of choice. Expectations that impel one person to move may not induce his neighbour, in similar circumstances, to do so. Degree of adventurous spirit, personal aptitudes or their subjective assessment, literacy and access to media of information, advice from friends and kinsmen who have already migrated may all have a bearing on the decision. Yet these non-objective factors that influence migration are also economically and socially conditioned; the aptitudes possessed by the migrants, their information on opportunities elsewhere, etc. depend on circumstances of the most varied kinds.

Economic and social characteristics help to select the migrants who will actually move to a given destination, while the experience of migration tends to transform the economic and social characteristics of the migrants themselves. Migration thus brings about a redistribution not only of numbers of people but also of the proportions of the people who possess given characteristics, between the places of out-migration and in-migration. In this way, the causes of migration can become circular and accumulative, with consequences that may or may not be in harmony with the changes envisaged by economic and social policy.

The calculations, at this point, are so schematic as to be open to criticism. Nevertheless the divergence between rates of absorption is too wide to be other than significant. Roughly speaking, one half of the migratory population is likely to become remuneratively employed within 12 years when national population grows at 2.0 per cent per year, and within 22 years when national growth reaches 2.5 per cent. At rates of 3.0 per cent and higher, only a dwindling minority of migrants can expect to find such employment at all.

At the same time, with the growth and redistribution of population, average densities of settlement in different regions rise, the size of cities and towns increases, the relationships between population and resources, the size of the market, and the size and range of qualifications of the labour force become altered. Different policy objectives become attainable, or necessary, in accordance with changes in density and in size of settlement.

Models taking into account the multi-dimensional correlations and inter-correlations indicated above would be of a degree of complexity eluding comprehension, and in any case the nature of the correlations could never be objectively established. In the next stage of the present study, a simpler and more intelligible approach has been attempted through the examination of the observable demographic "structures" that are resulting from present trends in the redistribution of population.

For some purposes of analysis, it is sufficient to divide a national entity into two or a few clear-cut categories, e.g. "urban" and "rural" population, the "primary", "secondary" and "tertiary" sectors of the economy. In such instances, "structure" can be envisaged in terms of proportions and balances between the two or several segments. For other purposes, however, it is more relevant to visualize population structure as a continuum, from one extreme to another, distributed according to, e.g., "size of community", "level of income", "level of educational attainment", or "capital-intensity of productive processes", a certain mobility being implied that continually alters the relative size of different groups within the continuum. One can then seek norms for the population structure according to whatever factor is being considered, although such norms may have no better basis than the structural relationships observable in countries that have reached the higher levels of economic and social development. While there is no reason to expect any close uniformity in the structures of different countries, if a very heavy concentration of population is found at some levels and a very weak representation at others in comparison with what might be expected from the norm, a presumption appears that there may be a bottleneck or rigidity in the population structure that impedes the mobility required for a harmonious adjustment of its parts one to another, and that may deserve the attention of the economic or social planner.

The present study will next pursue these structural questions in relation to two different types of geographical distribution of population: first, its distribution among regions within countries; second, its distribution among settlements of different sizes. Use must be made of data from past censuses and these throw only a very inadequate light on either type of distribution. The study

can thus be no more than exploratory. Some of its shortcomings can be remedied during the next two years as the complete tabulations of the censuses conducted around

1960 become available. Other defects must await the use in future censuses of more adequate and consistent definitions of regions and localities.

III. VARIATIONS OF POPULATION DENSITY WITHIN COUNTRIES

Population density in relation to local natural resources, especially land, determines the intensity with which such resources can be, or have to be, used. Since the natural conditions throughout a country are far from uniform, an even spread of population is not to be expected. An extremely uneven distribution of inhabitants in relation to the known disposition of land resources, however, implies that resources in some areas are heavily drawn upon while resources in other areas remain under-utilized. The detailed implications of varying population density among regions within a country can be studied and specified only when the regions are adequately defined and used in tabulations of demographic data, and when the resources and forms of organization, including the functions of the urban centres, in each region are adequately known. Not even the first of these two conditions can be met in the present study.

Regions ought to be delimited by the degree of convergence of economic and social interactions within them. Although such interactions are in many respects nation-wide or even world-wide, a relatively high proportion of them are confined within a smaller radius and concentrated around some regional centre or group of centres. Only a few attempts have been made in the Latin American countries, however, to distinguish standard internal regions for the purpose of separate study and programming, and in none of them has this regionalization become systematic and scientific. Regions are rather delimited, to the extent that they are recognized at all, in terms of administrative units, the historical boundaries of which do not necessarily coincide with modern socio-economic convergencies. Since population census data are commonly tabulated by such administrative units, the present study has had to rely on them, although they cannot be considered substitutes for true "regions", except for the purpose of time comparisons within a fixed framework for each individual country.

The combined area of Latin America is now inhabited at an average density of about 10 persons per square kilometre. Two small countries, Haiti and El Salvador, have reached the high densities of 150 and 120 persons per square kilometre respectively, and are followed by three other small Caribbean and Middle American countries, Cuba and the Dominican Republic with about 60 persons per square kilometre, and Guatemala, with about 35. Densities in the other small countries of the Middle American isthmus range from 23 in Costa Rica to 10 in Nicaragua, while Mexico, a large country, has 18 persons per square kilometre.

In South America, average densities are lower. The small countries of Ecuador and Uruguay are at the top, each with about 15 inhabitants per square kilometre, followed by Colombia with 13 and Chile with 10. The large countries Argentina, Brazil, Peru, and Venezuela have average densities near 8, while in the two inland countries, Bolivia and Paraguay, densities are only half that figure.

The wide variations in national population densities

really reflect the different extent to which the national territories have been fully occupied more than they do generalized national differences in population density. The averages for all the larger countries are brought down by their huge expanses of very sparsely peopled land. Some indication of the extent to which this is true can be obtained by ranging the major administrative divisions within countries in order of population density, and then comparing the average density of the divisions inhabited by one-half the national population — those most heavily occupied — with the average density of the divisions most thinly occupied and making up half the national area. Because of the varying geographical character, number, and size of the administrative divisions, comparison from country to country is not very meaningful, contrast in density being generally sharper where the units are many and small than where they are few and large. In spite of this lack of comparability, the following figures are instructive:

Year of census or estimate	A		B	
	Average density of major units combining one-half the national population at highest densities	Average density of major units combining one-half the national territory at lowest densities	C Ratio of A to B	
Argentina	1960	49.0	1.1	45
Bolivia	1950	7.4	0.7	11
Brazil	1960	43.7	0.7	66
Chile	1960	120.7	1.0	120
Colombia	1960	75.4	0.3	200
Costa Rica	1960	66.4	9.8	6.8
Cuba	1953	86.2	30.7	2.8
Dom. Rep.	1960	120.2	31.0	3.9
Ecuador	1950	33.1	0.4	80
El Salvador	1961	179.3	78.8	2.3
Guatemala	1950	87.1	5.1	17
Haiti	1950	129.0	96.0	1.3
Honduras	1961	31.4	1.9	17
Mexico	1960	64.0	5.0	13
Nicaragua	1950	32.5	1.0	34
Panama	1960	55.8	2.6	22
Paraguay	1960	61.8	0.3	200
Peru	1961	34.7	1.3	26
Uruguay	1958	197.1	5.4	36
Venezuela	1961	63.0	0.5	120

The four small countries, Cuba, El Salvador, Haiti, and the Dominican Republic, already noted as leading in national average population density, are in striking contrast to the others in the relative evenness of population distribution between territorial units of greatest and least density. Only one of the large countries, Mexico, is in an intermediate position in regard to evenness of distribution, with the density of the most populated group of units only 13 times that of the least populated. In all the other large countries the gap between the two groups is much wider. Only one of the countries with low overall population density, Bolivia, appears in as much as an intermediate position in regard to evenness of distribution, and this position is misleading, since the major

administrative divisions of Bolivia (departments) are few and large, in a country in which the mountainous terrain accounts for extreme inequality of population distribution between *municipios* within the departments. The low average densities of 30 to 35 for the more densely settled group of units in Ecuador and Peru are misleading for similar reasons, but similar average densities in the smaller units of Honduras and Nicaragua reflect more accurately the fact that in those two countries high-density areas are not very extensive. The territories of Argentina and Brazil are so large that, despite heavy population concentration within relatively small areas, one half the population already includes other areas of quite low density.

To sum up: one half the population of Latin America lives in administrative units inhabited at an average density of 60 or more to the square kilometre, while one-half the territory is inhabited at a density of only 2 persons to the square kilometre or less.

An examination of the data from successive censuses, for the countries possessing such data, indicates several distinct trends in the redistribution of population since the beginning of this century: movements toward a more even spread of population throughout the land area; movements toward concentration of a rising proportion of the population within small areas of high density, mainly the biggest cities and their immediate surroundings; and shifts from high-altitude areas to areas of lower altitude or coastal plains.

The trend toward a more even spread of population has been most pronounced in those countries in which relatively large parts of the national territory were previously occupied at a certain density, notably Cuba, Ecuador, El Salvador and Haiti. In some other countries, including Brazil, Chile, Costa Rica, and Mexico, there have been important population shifts towards areas of initially lower but still appreciable population density, rather than towards the national areas of very low density. In both groups of countries — with the possible exception of Brazil, where the data used refer to very large areas — these tendencies have been increasingly offset, if not superseded, by the rising trend towards a different kind of concentration of population — no longer concentra-

tion in certain mainly rural regions, but concentration in and around the largest cities. In Venezuela, the trend towards more even territorial dispersal of population and the trend towards urban concentration are simultaneously present, partly offsetting each other in statistical terms. In Panama and Uruguay, increasing accumulation of population in the area of the capital city has been the dominant trend since early in the century.

Population shifts from highlands to lowlands are particularly pronounced in Mexico, Colombia, Costa Rica, Ecuador, Peru, and Venezuela. In some of these countries, the location of the chief city in the highlands tends to offset this movement, which otherwise would appear even more striking. In Peru and to a lesser extent in Ecuador the location of the dominant city on the coast accentuates it. In so far as previously the highlands in these countries were much more densely populated than the lowlands, these displacements in altitude coincide with a more even spread of population, although in the Andean countries they affect coastal areas with a previously appreciable population density to a much greater extent than the nearly empty interior lowlands.

While the conditions affecting population redistribution differ widely from country to country in ways that cannot be touched upon here, the following rather broad inferences may be derived from available data:

(a) tendencies towards a more even spread of population have been more pronounced in high-density countries than in those inhabited at lower average density; in nearly all countries these tendencies were stronger early in the century than in more recent decades;

(b) tendencies towards concentration of population in small areas have gained momentum in successive decades and are now important in nearly every country;

(c) early in the century, the tendencies towards concentration were prominent mainly in low-density countries; more recently they have grown in importance in the more densely inhabited countries;

(d) settlement of the very extensive areas that have been nearly empty of population up to the present, particularly in the interior of South America, though progressing, has absorbed only a negligible fraction of increases in the respective national populations.

IV. URBANIZATION AND DISTRIBUTION OF POPULATION BY SIZE OF LOCALITY

The implications of the distribution of population among regions within countries differ according to the degree and kind of urbanization; it has already been suggested that the concentration of population in small areas of Latin America now depends much more on the growth of large cities than on increases in density of rural and small-town settlement. Let us next examine the distribution of population first between urban and rural areas and then among "inhabited localities" of varying sizes.

The difficulties of establishing a satisfactory dividing line between urban and rural localities are well known. The arbitrary figure of 2 000 inhabitants will here be used as the bottom limit for urban localities, although this criterion undoubtedly exaggerates to some extent the size of the population with truly urban traits. Two other difficulties that limit the comparability of data must be kept in mind: first the countries (and regions within countries) differ in the extent to which "urban" functions predominate in settlements of a given size. Villages devoted

entirely to agriculture may have larger populations in some countries (e.g. Mexico) than do many local commercial centres in others (e.g. Argentina). Also the general growth in population combined with improvements in transport and communications may mean that localities of a given size are less likely to have urban characteristics than in the past; strictly rural settlements may grow above 2 000 people without becoming more "urban" in their functions, and small towns may lose their commercial and other urban activities to the larger centres now become more accessible. (Conversely, of course, the improvement of communications is likely to bring about a diffusion of some urban traits into very small localities.) Present demographic data throw very little light on these important questions. In its later stages the present study will attempt to explore more deeply the functions and characteristics in different countries of the localities on the borderline between urban and rural, with their changes over time.

For present purposes, however, the fixing of a dividing line between "urban" and "rural" localities is of less interest than the patterns of distribution of population through the whole range of localities by size. Further difficulties arise in the comparison whether between countries or over a period of time, of populations in localities of varying sizes, and these difficulties are greatest with respect to the largest and the smallest localities. Only in a few countries of Latin America do the censuses distinguish "localities" within boundaries defined by strictly geographical criteria such as extent of definitely urbanized territory, rural nuclei of population grouped in physical proximity, and dispersed points of habitation in the countryside. In most cases, localities are delimited by administrative boundaries.

The smallest unit of administration in the majority of Latin American countries is the *municipio*, usually made up of an administrative centre or *cabecera* with its own boundaries, plus surrounding territory that may contain a number of population nuclei but is not further subdivided for administrative purposes. Since there are few large centres that are not *cabeceras*, the distribution of *cabeceras* by size within certain maximum and minimum size limits, is nearly equivalent to the distribution of all inhabited places by size. For smaller localities this system becomes increasingly unreliable because of the existence of centres without any administrative status that are larger than the smallest *cabeceras*. Nor do census tabulations distinguishing only between the population of the *cabecera* and that of the remainder of the *municipio* throw any light on the general character of the rural habitat, i.e., whether the people are grouped in villages or smaller nuclei or live mainly dispersed.

On the other hand, once a *cabecera* attains a respectable size its administrative boundaries may no longer correspond to the continuous urbanized area within the *municipio*. At a further stage of growth, this urbanized area may cover the entire *municipio* and expand beyond its bounds. The resulting city may eventually come to engulf other nearby towns, throw out solidly urbanized tentacles along the major highways, and establish such a dominance of its own economic, residential and recreational needs over peripheral towns and rural areas, possibly across the country's major administrative boundaries, that the whole may best be considered a single metropolitan region. To the extent possible the present study deals with some of the largest cities in terms of such geographic rather than administrative boundaries, but this could be done only through rough approximations, at the cost of some loss of comparability among cities of nearly equal size, and also of some loss of comparability over time, since metropolitan areas expand over more and more territory, incorporating cities and towns previously enumerated separately.

The most recent estimates indicate an increase in the urban population of Latin America — i.e., that in localities with 2 000 or more inhabitants from 61 million in 1950 to 95 million in 1960, or at an average annual rate of growth of 4.5 per cent. Rural population — i.e. the remainder — meanwhile grew from 95 million to 111 million, or at an average annual rate of about 1.5 per cent. In 1950, only Argentina, Chile, and Uruguay had urban majorities, while in eleven countries the urban population was less than 30 per cent of the national total. In 1960, more than half the population was urban also in Cuba, Mexico, and Venezuela, while only in the Do-

minican Republic, Haiti, and Honduras is the urban population believed to be still below the 30 per cent mark. The rapid rises in percentage of urban population in Brazil, Mexico, Peru, Venezuela, and the Dominican Republic are now documented by new census data, as are the more modest increases in Argentina, Chile and El Salvador. On the whole, the percentage of urban population rose fastest in countries at intermediate levels of urbanization, more slowly both in countries already predominantly urban and in those very little urbanized. If present trends continue, regional urban population will exceed rural from about 1966.

For the twenty Republics combined, the estimates show an absolute ten-year gain of 34 million in urban population and of 16 million in rural population. Had there been no transfers of population from rural to urban sectors, urban population would have gained only about 20 million while the rural population would have grown by 30 million, hence a net transfer of 14 million persons over ten years appears to have occurred. Actually, the transfer may have been somewhat larger and rising over the years in relation to general growth of population.³

Moreover, available statistics show that the more strictly urban centres with 20 000 or more inhabitants have been growing more rapidly than the urban population as a whole, even when comparisons are made in terms of a fixed number of urban places, so as to eliminate localities that have moved from a lower to a higher-size class between 1950 and 1960. It follows that smaller towns between 2 000 and 20 000 in population must have been growing with relative slowness. Unfortunately, the variations in census definitions are severe impediments to an internationally comparable presentation of trends in the growth of population centres of the different size classes. The trends must be studied separately for each country with methods modified in accordance with the available statistics.

The most striking advances have been made in the numbers and size of cities — or metropolitan areas — which surpass one million inhabitants each. Buenos Aires was Latin America's only "million" city until 1930, when Mexico City passed this mark, soon to be followed by Rio de Janeiro and São Paulo. By 1950, Havana, Lima and Santiago were also above one million, bringing the number of such cities to seven. By 1960, Bogota, Caracas and Montevideo were added. If present trends continue there may be sixteen "million" cities by 1970 and twenty-six by 1980.

The rising number of "million" cities contained 8 million people in 1940, 16 million in 1950, and 27 million in 1960. If their combined population continues to rise at 6 per cent annually, it will reach 48 million by 1970 and 90 million by 1980.

The high proportions of total urban population concentrated in a single city, usually the national capital, has long been one of the characteristic features of urbanization in the majority of Latin American countries; there are only two countries (Brazil and Colombia) in which the leading city does not contain at least one quarter of the total urban population. In the majority

³ The calculation assumes equal rates of natural increase in urban and rural population. In practice, because of higher rural birth rates, natural increase tends to be higher in rural areas. On the other hand, some previously "rural" localities must have entered the "urban" category simply by growing above the 2 000 population limit. It is probable that the numerical effect of the first phenomenon has been greater than the offsetting effect of the second. Accordingly, the roughly calculated transfer of 14 million persons represents a minimum estimate.

URBAN AND RURAL POPULATION, IN THOUSANDS, 1950 AND 1960, URBAN
POPULATION BEING DEFINED AS THAT OF LOCALITIES
WITH 2 000 OR MORE INHABITANTS^a

Country	1950				1960			
	Urban	Rural	Total	Per cent urban	Urban	Rural	Total	Per cent urban
Uruguay ^b . . .	1 893	514	2 407	79	2 313	514	2 827	82
Argentina . . .	11 038	6 151	17 189	64	14 161	6 795	20 956	68
Chile	3 513	2 560	6 073	58	4 801	2 826	7 627	63
Venezuela . . .	2 430	2 544	4 974	49	4 521	2 810	7 331	62
Cuba	2 713	2 795	5 508	49	3 709	3 088	6 797	55
Mexico	11 826	14 000	25 826	46	18 740	16 248	34 988	54
Colombia	4 253	7 426	11 679	36	7 134	8 334	15 468	46
Panama	287	510	797	36	433	622	1 055	41
Brazil	16 021	35 955	51 976	31	27 800	42 800	70 600	39
Costa Rica . . .	232	569	801	29	443	728	1 171	38
Peru	2 388	6 133	8 521	28	3 890	6 967	10 857	36
Ecuador	885	2 312	3 197	28	1 499	2 818	4 317	35
Nicaragua	298	762	1 060	28	501	976	1 477	34
Paraguay	388	1 009	1 397	28	597	1 171	1 768	34
El Salvador . . .	517	1 351	1 868	28	795	1 647	2 442	33
Guatemala	674	2 131	2 805	24	1 167	2 598	3 765	31
Bolivia	778	2 235	3 013	26	1 104	2 592	3 696	30
Dom. Republic .	458	1 673	2 131	21	872	2 142	3 014	29
Honduras	247	1 181	1 428	17	438	1 512	1 950	22
Haiti	340	3 040	3 380	10	523	3 617	4 140	13
Total	61 179	94 851	156 026	39	95 431	110 815	206 246	46

^a Estimates of urban and rural population for mid-year 1950 and mid-year 1960 were first published in the November 1960 issue of the Statistical Supplement of the *Economic Bulletin for Latin America*, and in partly revised form in the November 1961 issue. The present table contains more extensive revision based largely on new data from censuses carried out in ten countries during 1960 and 1961. Further revisions will be needed when the results of other censuses become available.

^b For lack of a recent population census, the "urban" population of Uruguay was estimated as that of localities having schools of an "urban" type.

of countries recent population trends are confirming this concentration. Calculations, some of which depend on rather rough estimates, show that between 1950 and 1960 the percentage of urban population increase absorbed by the leading cities in a majority of countries exceeded their previous share of the urban population.

Can the Latin American urban population, with its obviously high degree of concentration, be measured against any objective standard for the "normal" distribution of cities by size? A number of scholars have examined such distribution patterns in other regions in the course of their studies of inter-community equilibrium in economic activities. They have commonly made use of the so-called "rank-size rule" as a theoretical model of the distribution of cities by size to which actual observations conform more or less closely.⁴ According to the rank-size rule, the population of each city tends to be in inverse proportion to its rank by order of size. Thus, the second, third, and fourth largest city might be expected to have one-half, one-third and one-quarter the population of the largest city, and so forth.

The theoretical implications of the rank-size model and the interpretation of observed departures from it in the

actual distribution of cities in a given country are matters on which agreement has not been reached. Cities specialize to varying degrees in their functions and differ in the territorial radius within which these functions are effective. For many of these functions, concentration and dispersal of the urban population offer competing advantages and drawbacks, e.g., proximity to sources of raw materials and local markets vs. internal economies of scale and availability of a large and varied labour force. It is not obvious that the most advantageous distribution of cities must conform to the rank-size rule; the size, geographical configuration and level of development of the country may explain considerable deviations from it. Nevertheless, very wide deviations from the model distribution, or very marked discontinuities therein — unless explicable in terms of some known special features peculiar to the country — are presumptive evidence of some structural anomaly within the country's urban system. This view is plausible, even if one refrains from accepting any doctrinaire interpretation of the matrix of interrelations which might account for the observed approximate conformity of city distribution in many countries to the rank-size rule.

If nothing more, the rank-size rule can be used as a yardstick in relation to which the city distribution of different countries can be compared and time-changes in the structure of each urban system can be noted. This has been done in certain studies referring to industrialized countries: it was observed that, from an initial relative dominance of the largest city, closer conformity of city distribution to the rank-size rule was progressively

⁴ The rank-size rule is virtually equivalent to the "Pareto curve". Authors who have used these tools to study size distribution of cities have been cited in *The Determinants and Consequences of Population Trends* (United Nations Publication, Sales No. 53.XIII.3), pp. 175-176. See also Walter Isard, *Location and Space Economy, A General Theory relating to Industrial Location, Market Areas, Land Use, Trade and Urban Structure* (Massachusetts Institute of Technology, 1956), particularly Chapter 3, "Some Empirical Regularities of the Space Economy".

POPULATION (IN THOUSANDS) OF LARGEST CITY (IN BRAZIL AND ECUADOR, TWO
LARGEST CITIES), RELATIONSHIP TO TOTAL URBAN POPULATION, AND
PERCENTAGE OF 1950-1960 INCREASE IN URBAN POPULATION
ABSORBED BY LARGEST CITY

Country	City	Population		Per cent of urban population of country		Population increase of largest city as percentage of 1950-1960 increase in urban population
		1950	1960	1950	1960	
Argentina	Buenos Aires ^a	5 100	7 000 ^b	46	49	61 ^c
Bolivia	La Paz	320	450 ^c	41	41 ^c	40 ^c
Brazil ^d	Río de Janeiro	2 303	3 200	14	12	} 18 ^e
	São Paulo	2 017	3 250	13	12	
Chile	Santiago ^f	1 275	1 900	33	40	49
Colombia	Bogotá	620	1 118	15	16	17
Dom. Republic	Santo Domingo	180	365	39	42	59
Ecuador	Quito	210	314	24	21	} 48 ^e
	Guayaquil	259	450	29	30	
Paraguay	Asunción ^g	219	311	56	53	44
Peru	Lima-Callao ^h	1 075	1 875	45	48	50
Uruguay	Montevideo ⁱ	935 ^c	1 150 ^c	49 ^c	50 ^c	51 ^c
Venezuela	Caracas ^g	694	1 250	29	28	27
Costa Rica	San José ^g	140	250 ^c	60	56 ^c	52 ^c
Cuba	Havana ^j	1 080	1 600 ^c	40	43 ^c	52 ^c
El Salvador	San Salvador ^g	162	248	31	31	31
Guatemala	Guatemala	284	400 ^c	42	34 ^c	24 ^c
Haiti	Port-au-Prince	134	240 ^c	39	46 ^c	57 ^c
Honduras	Tegucigalpa ^g	100	180 ^c	41	41 ^c	42 ^c
Mexico	Mexico ^k	2 884	4 666	24	25	26
Nicaragua	Managua	110	210 ^c	37	42 ^c	49 ^e
Panama	Panama	175 ^l	265	56 ^l	61	61

^a Metropolitan region as defined for censuses of 1947 and 1960, respectively.

^b Estimate very rough; 6 763 000 according to probably incomplete census data; between 7 206 000 and 7 341 000 according to alternative estimate.

^c Estimate very rough.

^d Cities not defined as metropolitan regions.

^e Combined percentage for the two leading cities.

^f Metropolitan region as defined in 1952 census.

^g Metropolitan region as defined in 1950 census.

^h Urban population of the Provinces of Lima and Callao.

ⁱ *Departamento* of Montevideo.

^j Metropolitan region as defined for censuses of 1943 and 1953.

^k Urban population of *Distrito Federal*.

^l Within new administrative city limits; census figure for 1950, within then narrower city limits, is not comparable.

attained in the course of industrialization. The interpretation of this phenomenon, in terms of "forces of concentration" and "forces of dispersal", admittedly remains controversial.

The distribution of cities by size in the majority of Latin American countries does, in fact, show large deviations from the rank-size rule. The degree of deviation can be indicated by a table comparing the populations in groups of cities which, by the rank-size rule, ought to be equal. These groups are defined as follows:

Group I: the largest city.

Group II: cities 2 and 3 and a fraction of city 4.

Group III: cities 5 — 10, and fractions of cities 4 and 11.

Group IV: cities 12 — 30, and fractions of cities 11 and 31.

Group V: cities 32 — 82, and fractions of cities 31 and 83.

The relative sizes of these five groups, expressed in index numbers whose inter-group geometric average equals 100, show up as follows:

	Date of census	Group I	Group II	Group III	Group IV	Group V
Argentina . . .	1947	370	77	71	65	77
Bolivia . . .	1950	182	112	103	68	70
Brazil . . .	1960	95	128	91	87	84
Chile . . .	1952	232	70	67	97	93
Colombia . . .	1951	101	121	99	92	88
Costa Rica . .	1950	194	71	111	86	...
Cuba . . .	1953	257	69	77	93	77
Dom. Republic .	1950	171	82	85	83	...
Ecuador . . .	1950	152	159	76	80	69
El Salvador . .	1950	150	84	79	96	103
Guatemala . . .	1950	263	46	59	95	144
Haiti . . .	1950	187	65	93	93	93
Honduras . . .	1961	145	98	77	88	...
Mexico . . .	1950	237	66	69	87	106
Nicaragua . . .	1950	163	94	88	91	81
Panama . . .	1960	328	90	63	58	74
Paraguay . . .	1950	289	55	59	88	120
Peru . . .	1961	396	56	67	81	83
Uruguay . . .	1908	271	47	78	...	...
Venezuela . . .	1961	164	95	82	93	85

Unfortunately, not all the countries that have conducted censuses since 1960 have as yet issued tabulations per-

mitting the use of the most recent urban population figures in the above table.

Detailed study of the figures indicates that neither the size of the country nor the size of its urban system has any systematic influence on its pattern, except in the case of Brazil, where, evidently, in a very large territory, the distribution of urban functions may be quite different from that of the other countries. If Brazil is excepted, the following features emerge from a comparison of the urban systems:

(a) As was to be expected, the first city towers above the other groups in almost every country. In most instances, first-city dominance is even more striking when group I is compared with group II (the second and third cities, plus two-thirds of the fourth). Group I is 7.2 times the size of group II in Peru; it is more than 5 times the size of II in Uruguay, Guatemala and Paraguay; more than 4 times in Argentina; more than 3 times in Cuba, Mexico, Chile and Panama; more than twice in Haiti, Costa Rica and the Dominican Republic; and between 1.8 and 1.4 times in El Salvador, Nicaragua, Venezuela, Bolivia and Honduras. Group II equals or surpasses group I only in Ecuador, Colombia and Brazil.

(b) While there is considerable variation in the relative sizes of the different groups, groups II and III tend to be the weakest, with combined populations increasing from group III to group V quite markedly in several countries.

(c) There is a positive correlation between the first feature and the second; that is, the more disproportionate the size of the largest city, the more regressive the distribution of population in smaller cities and towns from the third group onward tend to be.

The relatively small size of groups II and III suggests a kind of structural discontinuity, which may have originated in disproportionately rapid growth of the first city or disproportionately slow growth of those next in rank, or both. Data on time-changes in city distribution, to the extent that they exist, have yielded no conclusive evidence on this point, although in a number of countries it appears that marked regressivity in the size of the groups of cities of lower rank has preceded rather than followed the increase in relative dominance of the first city.

Incomplete data from the most recent censuses suggest that in a majority of the countries in which first-city dominance is particularly pronounced the gap between the first city and those of the second and third rank continues to widen. Among the countries in which the largest city (group I) stands above 200 in the table this appears to be true of Argentina, Chile, Panama, and Peru, while information is lacking or inconclusive for Cuba, Guatemala, Paraguay, and Uruguay. Mexico is the only known exception in this class of countries; although metropolitan Mexico City is rising more rapidly than the urban population as a whole, it is being out-

distanced in rate of growth by some vigorous cities in groups II and III. On the other hand, of the two countries in which first-city dominance is absent, Brazil shows rates of growth rising from group I to group V, while Colombia has its highest rates of growth in groups II and III. Venezuela, with a relatively even initial distribution in the five groups, shows remarkably even, although very high, rates of growth from group I to group V.

The cases are too few, the comparability of the data too limited, and the special factors influencing each case too many and too imperfectly known to permit this analysis to be carried much further. In particular, the causal relationship, if any, between first-city dominance and regressivity in size-distribution of the smaller cities cannot be determined at present. Two alternative hypotheses might be formulated: (i) where populations among all except the first few cities are initially rather evenly distributed, none of the smaller cities provide sufficiently strong points of attraction for urban growth, so that a disproportionate part of it flows into the one or two leading cities; or, (ii), where one city has become dominant at an early stage, it inhibits particularly the growth of the second and third rank cities that compete with it most directly, while not affecting the growth of smaller cities and towns to such an extent. Or one might hypothesize that both causal relationships exist and reinforce each other. Present evidence is clearly insufficient to confirm them or to trace in what manner — through bottlenecks in transportation, administration, distribution of goods, capital or skilled labour force — the present distribution of urban population has been influenced.

One might expect the kind of discontinuity in the urban system that has been noted to have unfavourable implications for economic and social development. The functions of cities of the second and third rank as regional centres are presumably not being adequately carried out; urbanization taking place largely through migration concentrated upon the largest cities implies a maximum break in cultural and occupational continuity for the migrant, with a likelihood of multiple maladjustments. Various kinds of evidence other than demographic support such conclusions. It is interesting, however, that the table shows no correlation between first-city dominance with accompanying small-city regressivity and either the level or the rate of economic development attained by the different countries, measured by their *per capita* national incomes.⁵

⁵ A recent statistical study of 95 countries also concludes that "different city size distributions are in no way related to the relative economic development of countries", although correspondences can be detected between the size distribution and certain characteristics or degrees of specialization in the national economies. (Brian J. L. Berry, "City Size Distributions and Economic Development", *Economic Development and Cultural Change*, July 1961, pp. 573-587.)

V. GEOGRAPHICAL REDISTRIBUTION AND OCCUPATIONAL REDISTRIBUTION OF POPULATION

Urbanization in Latin America, as in other predominantly rural and low-income regions, has been associated with a more pronounced growth in the third (commerce and services) than in the second (industry) of the three main groups into which the labour force is conventionally divided. In some countries, in fact, the percentage of the

labour force in industry does not seem to have increased at all, in spite of a large-scale movement of workers out of agriculture and into the cities.⁶ In high-income eco-

⁶ A number of studies have discussed the employment situation and presented the statistical evidence. See, for example, the 1957 *Report on the World Social Situation* (United Nations Publica-

nomies an increasing share of manpower taken by commerce and services may indicate that this manpower, no longer needed for production, is responding to the varied demands associated with a high standard of living. In economies at the levels typical of Latin America, however, a similar statistical phenomenon can be considered, at least in part, as another way of expressing the growth of the urban marginal populations already discussed. Persons unable to find productive employment are taking refuge in miscellaneous service occupations and in petty trade.

Unfortunately, employment data from the censuses conducted around 1960 are not yet available in sufficient detail to indicate the extent to which recent trends bear out the conclusions that have been reached through analysis of 1950 census data. Some recent explorations of the 1950 data give added support to earlier hypotheses on the relationships between urbanization, in-migration and disproportionate growth of the tertiary sector, and suggest promising lines for more intensive analysis once new data are forthcoming.

First, the proportions of the three sectors of the labour force within the major administrative units of several countries have been related to their balance of migration. It appears that an excess of in-migrants is much more consistently associated with an above-average tertiary sector than with an above-average secondary sector. Administrative units with an excess of in-migrants invariably show a tertiary sector much larger than the secondary, even when the unit in question is outstanding for its industrial development, as in the cases of the states of Nuevo Leon in Mexico and São Paulo in Brazil.⁷

Secondly, the proportions of the three sectors within minor administrative units (*municipios*) of a few countries have been related to the size of the urban nucleus in each unit.⁸ This study confirms the predominance of the tertiary sector in the more urbanized units, and suggests important differences between countries in the size-limit at which the "urban" nucleus ceases to contain an important proportion of workers in agriculture, but has not as yet led to more specific conclusions that can be summarized for present purposes. Such an analysis, when it can be applied to more precisely defined occupational groups within the three sectors, should provide valuable information on the relationships between size of the urban nuclei and functions.

In fact, a simple comparison of the sizes of the secondary sector itself is known to include many marginal workers in home industries and sweatshops of low productivity, and thousands of unskilled, intermittently employed workers in construction are in no better position. The presence of abundant unskilled labour may also lead even the larger and more modern industries to employ many in low-paid manual jobs (such as loading and moving of materials) that would otherwise be mechanized.

At the same time, the tertiary sector includes various occupational groups (such as school teachers and public

health workers) that are both essential and commonly under-represented in relation to needs. Other tertiary occupations, while absorbing a larger proportion of the labour force than could be justified economically, afford satisfactory incomes and are not accessible to the marginal population. Unskilled rural workers are not the only migrants to the big cities. The flow of middle and upper-class elements from the smaller cities and towns, particularly in the form of youths with secondary or higher education, and the consequent inflation of public employment and other white-collar occupations also contribute significantly to the large size of the tertiary sector.

It has been argued that the rapid and concentrated nature of urbanization in Latin America maximizes the difficulty of absorbing the migrant labour force into productive employment. Industries face a well-known shortage of skilled workers and qualified foremen combined with an excess of labour that is not only unskilled but also hindered from the acquisition of skills by illiteracy, poor physical condition and irregular work habits. The educational and vocational training prerequisites for a better matching of the qualifications of the labour force with industrial needs are formidable.⁹ A wider diffusion of small-scale industries and of mechanical occupations in general in the smaller towns would undoubtedly ease the transition between agricultural and industrial labour in environments presenting less drastic demands for adaptation to a new kind of society than do the big cities. The latter provide their own settings for social transition in the peripheral slums and for occupational transition in the numerous labour-intensive home industries that have sprung up, but under present conditions the extent to which transitional mechanisms really promote adaptation to industrial work of higher productivity is doubtful.

It can also be argued that the movement of the social strata possessing education, enterprise, or capital from the smaller centres to the largest cities deserves as much attention as the movement of the unskilled marginal groups. The latter can hardly be expected to halt their drift to the city slums unless they are offered real opportunities nearer home, and this can be done only if the smaller cities can hold persons with administrative talents, professionals, entrepreneurs and investors. The cumulative forces influencing the growth of the national capitals have been often described, although detailed studies revealing their relative importance and inter-relations are few. The increasingly concentrated market for consumer goods and services, the large and relatively varied labour force, the proximity of the governmental and financial institutions with which the enterprises need to maintain continuing contact, among other factors, mean that the motives inducing the university graduate and the would-be industrialist to settle in the capital are likely to become ever stronger, unless countered by effective regional planning. Conversely, the ability of the smaller centres to offer attractive employment, to serve as links in a truly national economic system, or to offer the services needed by the rural economy is likely to become ever weaker. In fact, the very predominance of the national

tion, Sales No.:1957.IV.3.), pp. 125-127, and "Creation and Employment Opportunities in Relation to Available Manpower" in *Urbanization in Latin America* (UNESCO, Paris, 1962).

⁷ See Part I, Chapter IV, in Jaime Dorselaer and Alfonso Gregory, *La Urbanización en América Latina*, Estudios Sociológicos Latinoamericanos No. 2, Centro Internacional de Investigaciones Sociales de FERES, Fribourg (Switzerland) and Bogotá (Colombia), 1962.

⁸ Study undertaken by the staff of the *Centro Latinoamericano de Demografía*.

⁹ See "Manpower Structure, Educational Requirements and Economic Development Needs" (UNESCO/ED/CEDES/36; ST/ECLA/CONF.10/L.36), study prepared jointly by the Secretariats of ECLA and UNESCO for the 1962 Conference on Education and Economic and Social Development in Latin America. This document shows by means of a graph the wide differences between the typical "profile" by level of skills of the labour force in economically developed and under-developed countries.

capital or other metropolis renders it less capable of influencing the rest of the country in the direction of a nationally integrated economy or social order. For lack of an adequate urban network carrying a two-way flow of goods and innovations between the metropolis and the hinterland, static local social structures, loyalties, and systems of production and trade persist in the latter.

One of the few explorations of this process in a specific setting was made in Central Peru by a mission under the auspices of the Organization of American States.¹⁰ The table on size distribution of cities (p. 27 above) has indicated that in Peru first-city dominance has reached an extreme unmatched in any other Latin American country. In relation to the central third of the country, the attraction of the Lima-Callao metropolitan agglomeration is naturally even more overwhelming, with particularly ominous consequences in the Sierra sub-region. Here the population is 70 per cent rural, and it is unlikely that the land can support a much heavier population than at present. The wealthier and better educated elements of the Sierra cities have increasingly been attracted from them to the metropolis. Their populations have grown, but mainly through replacement of the older urbanites by peasants unable to support themselves on the land; thus, they become increasingly "ruralized" and even less capable than before of providing varied job opportunities. Since their capacity to employ their new residents is limited, many of these sooner or later join the current flowing directly from the rural communities to Lima-Callao. The agricultural valleys and towns of the second

¹⁰ Division of Economic Development, Department of Economic and Social Affairs, Pan American Union, *Integración Económica y Social del Perú Central*, Appendix II, Washington, 1962.

sub-region, the Costa, are in a healthier position economically, but are unable to absorb their own population increase, and thus contribute another stream of migrants. A counter-movement is under way into the nearly uninhabited third sub-region, the Montaña, involving not only Sierra peasants but also Lima professionals and business men disillusioned with opportunities in the metropolis, but this is on too small a scale to obviate a forecast that metropolitan dominance and provincial stagnation will continue to increase unless vigorous measures are taken to bring new life to the Sierra towns and to create alternative industrial centres along the Costa.

At the same time, the study suggests that one part of the Sierra, the Mantaro Valley with its major city of Huancayo, has avoided the decline found elsewhere, largely because of a more favourable agricultural and marketing situation and a more even distribution of land holdings. The exception is as interesting as the more general confirmation of the unfortunate effects of excessive first-city dominance. A superficial observation of other countries indicates that while some regional economies are drained of vigour by the attraction of the metropolis, others remain capable of healthy growth. Comparative studies of the factors behind these differences are needed as a basis for programmes to bring about a more general strengthening of provincial towns and local economies. The present paper cannot go farther into the complex questions of regional development planning, but it appears that if such planning is to become effective much wider information will be needed than now exists on the functions of cities of differing sizes and geographical positions — on their institutions, the professional and other services they offer, their types of employment, etc.

VI. THE RURAL HABITAT

The paucity of information on rural settlement patterns in Latin America is both surprising and significant. It has already been pointed out that very few of the censuses indicate the groupings of population outside the more or less urban *cabeceras* of *municipios* or other local centres with special administrative status. A considerable number of local and regional studies made by anthropologists, rural sociologists, geographers, agricultural economists and other specialists can throw some light on the rural habitat, but these sources have not been systematically combed for the purpose, and at best they can hardly reveal the wide range of local situations that must exist in a region of such geographical diversity, or their relative importance. The detailed maps that have been made of some parts of some countries are another potentially valuable source of information, but their coverage is limited as yet, and it is probable that many of them do not indicate the more scattered or impermanent types of rural dwelling. There is practically no literature focused on the relationships between man, land and community in the region.

The failure to secure systematic nation-wide information on the rural habitat is only one symptom of the neglect of rural problems that has characterized most Latin American countries in the past. Such a deficiency is obviously incompatible with the present goals of comprehensive planning and rural structural reforms. Without accurate

knowledge of settled patterns it is impossible to determine the most efficient sizes and locations of rural schools, or public health clinics; the number of farms that can be served by an agricultural extension worker; the needs for feeder roads; the practicability of co-operatives, supervised credit schemes, electrification, or piped water supplies.

Plans for agrarian reform and colonization of vacant land imply a large-scale regrouping of the rural population, and only a better understanding of present settlement patterns and the reason behind them can lead to the adoption of improved patterns rather than a planless reproduction of the old. Such an understanding is also one of the prerequisites for effective national policies intended to influence population redistribution. The ominous implications of a low and inflexible rate of net rural population growth combined with high national growth rates have been pointed out above. Can reforms in rural settlement patterns help to raise the capacity of the rural areas to absorb their own natural population increase?

Studies of "human geography" carried out in other regions have defined a number of alternative types of rural settlement, from the large, compact village to the complete dispersal in which each farmer lives in the middle of his own land, each type having its own advantages and disadvantages. The larger and more compact the settlement, the easier is the maintenance of effective com-

munity organization and the provision of the services associated with a modern standard of living, but the obstacles to agricultural efficiency presented by the long distance between the farmer's home and his land may offset these advantages. Conversely, very small nuclei or dispersed farm homes present serious social disadvantages, unless the transport and communications system is so highly developed as to prevent their isolation, but may be agriculturally more efficient.

The present paper can do no more than set forth some hypotheses concerning the major problem of the rural habitat in Latin America. These hypotheses can be supported by items of information of uncertain representativeness, and are in general accord with the present consensus of informed opinion in the region, but they need to be tested by a systematic examination of all existing sources of information as well as by local monographic studies.

(a) In the majority of countries the proportion of the rural population living on large land holdings is quite high, although very few of the censuses distinguish this category of settlement. In Chile, the 1930 census showed 1 124 000 persons, about half the total population outside the centres of 1 000 or more inhabitants, living on *fundos*. The survey of Central Peru discussed above estimates that about half the rural population of the Sierra sub-region live on *haciendas*. The variety of settlement patterns within the large estates is great, ranging from modern plantations with workers concentrated in "company towns" built and supervised by the management to traditional *haciendas* with families building their own huts on dispersed plots of land granted in exchange for labour; but in general the large estates have maintained a limited, paternalistic community system rather isolated from life outside. The fact that the estates have provided shops and other services for their workers — dealing largely through scrip or continuing accounts offset against wages rather than cash — has also hindered the growth of nuclei of shopkeepers and other non-agricultural occupations in their vicinity.

(b) A high proportion of the remaining rural population has consisted of owners of small plots or squatters on the margins of the large estates and dependent on them for seasonal wage labour. The character of their holdings — often on broken hillside land and separated by large holdings occupying the valleys — has hindered their grouping into sizable villages, although in some Indian-populated areas they have maintained strong systems of community organization.

(c) In the more thinly populated areas, geographical conditions and shifting systems of cultivation have favoured very small population nuclei or scattered settlement rather than large villages.

(d) The predominance of large paternalistic estates or of rural nuclei too small and poor to exert influence or offer an inviting market has limited the possibilities for growth of the small towns (mainly *municipio* administrative centres) and has caused them to turn inward, monopolizing local political functions and government ser-

vices, rather than acting as effective marketing and servicing centres for the rural areas or sources of employment for the surplus rural population.

The rural settlement patterns that have emerged seem, on the basis of the scanty available data, to show a higher degree of dispersal of rural population and fewer organized community functions (except in Indian-populated areas) than is the case in most other predominantly rural regions. The proportion of rural population living completely dispersed, by single families, however, is probably much smaller in the majority of countries than the population living in very small nuclei ("hamlets") with fewer than 200 inhabitants. In Venezuela, at the time of the 1950 census, two-fifths of the national population lived in 39 753 nuclei with fewer than 500 inhabitants each, and with an average population of 79. This finding coincides with a survey of sample rural districts, according to which the average rural population nucleus in Venezuela (excluding *municipio* centres) has only 13 houses and 73 people. Nuclei of this size can support only the most rudimentary community services, especially if widely separated.

Mexico is alone among the larger countries in having relatively extensive census and other information on rural settlements — a situation that coincides with an early breakaway from the pattern of rural dominance by large estates and a longer tradition of concern for rural problems than is to be found elsewhere in the region. In Mexico, furthermore, the *ejido* has become a new type of rural nucleus within the *municipio*, with its own forms of self-government and requirements for statistical recognition. Mexican statistics show a larger proportion of the rural population living in sizable villages than seems to be the case elsewhere, and also a trend toward consolidation of settlements. Between 1940 and 1950, the number of nuclei between 101 and 1 000 in population rose from 26 821 to 29 918 and their combined population from 7 777 000 to 9 160 000 while the number of nuclei with fewer than 100 people fell from 75 676 to 65 090, and their population from 2 004 000 to 1 772 000. Even in Mexico, however, the shifts in rural settlement do not seem to have called forth effective planning for their improvement.¹¹ Panama is the only other country for which census data give substantial information on trends in rural settlement. In this country dispersed settlement by smallholders and squatters is particularly important, and the degree of dispersion seems to be increasing. Between 1930 and 1960, the population in nuclei between 100 and 499 inhabitants grew from 173 000 to 276 000, while the population in nuclei with fewer than 100 people grew from 95 000 to 200 000.

¹¹ "The agrarian program alone has created many new rural communities since 1930. The majority of these have received little or no planning with regard to the location of the homes in relation to the farms or to the spacing of houses and lots with reference to one another. Public agencies might do well to give these matters careful consideration in any new communities to be developed in the future." Nathan L. Whetten, *Rural Mexico*, University of Chicago Press, Chicago, Ill., 1949, p. 49.

TECHNOLOGICAL RESEARCH IN LATIN AMERICA*

I. AIMS OF THE STUDY

If the economic development of Latin America is to be speeded up, what is needed in addition to increasing investment is an intensive campaign to shed light on the methods and procedures making for the maximum possible yield from new and already existing capital as well as from the other natural resources of the countries concerned. The technological practices of industrially more advanced countries can in many cases be applied directly to the new activities of the developing countries, and constitute a tool which can have a decisive effect in speeding up economic development.

However, in most cases these technologies have to be adapted to the productive methods and factors peculiar to the countries in which they are to be applied. Among the many causes which may call for adaptation involving changes, the following may be mentioned by way of example: (a) modifications which are unavoidable as a result of variations in the raw materials available; (b) the difference in the relative availability of such important productive factors as capital and labour; (c) adaptation of processes to the scale of operations imposed by market conditions in the new environment; (d) a whole series of combinations of the above causes. Such changes in equipment design and production procedures as must inevitably be introduced should be the result of careful research in applied technology. This is the problem which will be taken up in the present paper.

However, there are a number of other areas in which technological research can contribute very effectively to economic development. One example is the following: in view of the fact that expansion of exports is a powerful growth incentive, there is justification for the belief in Latin America that some of the region's raw materials might be modified so as to adapt them to the specifications of other similar materials traded on the international market. Pursuing the same line of thought, a further step forward would be a search among Latin American materials for substitutes for some of the raw materials now imported by the more industrialized countries.

Thus, when economic development programming approaches the problems and possibilities of sectoral development — particularly in industry and the exploitation of each country's natural resources — it should be closely linked to technological research which, in fact, constitutes an important element of economic development programming. Hence, a methodical survey of existing natural resources and technological research into the possibility of their industrial preparation and utilization are an essential prerequisite of sectoral programming and, at the same time, must themselves be the subject of careful programming. This does not mean that it is impossible or unwise to embark upon industrial development and applied technological research before the relevant

programmes have been given final shape. The knowledge which countries usually possess of most of their natural resources is often enough to enable a start to be made, and if systematized and properly arranged, can provide an adequate basis for outlining the main features of a methodical policy of research and industrial development. Progress in industrial programming will subsequently provide the knowledge and means required to improve research programming and to introduce changes in particular aspects where it is necessary or advisable.

Many Latin American countries can pride themselves on the progress they have achieved in their manufacturing industries. This may tend to obscure the problem that still remains, by detracting from the importance of the task to be carried out, namely to strengthen technological research. The procedure usually applied in setting up new industries has been to observe the pattern of imports and select items which can be manufactured in the country. Once an item is selected, the way in which it is produced in the more industrially advanced countries is studied and, in most cases, the techniques and equipment needed to manufacture it are imported. Little is done to adapt and utilize such local raw materials as may be available. Generally, all or most of the raw materials are imported immediately so that the new industry can begin to operate.

Obviously this type of activity, where a country processes and uses the imported raw material instead of purchasing the finished product abroad, contributes to economic development since it creates employment with a relatively high level of productivity. However, it is becoming increasingly difficult to keep this system up indefinitely. On the one hand, the number of products for which substitutes can be found is decreasing and on the other hand, a factor of inelasticity is introduced into imports in relation to economic difficulties with which the country may be confronted. When finished products are imported, a policy of import restrictions is relatively easy to apply. On the other hand, when the commodities imported as substitutes are raw materials, a restrictive import policy is likely to bring about domestic problems involving the closing down of industries and loss of employment.

In the industrially more advanced Latin American countries, industrial progress by means of the procedure described is coming to an end, since in most of them the purchase abroad of finished consumer goods has been gradually reduced to very small quantities. Two main areas of action are open for the future: the production of capital goods or the increasing adaptation of domestic natural resources with a view to replacing the raw materials and semi-finished products which are still being imported. Both can be exploited at the same time, and hence technological research is more vital than ever. As an illustration of what can be done by research in the production of capital goods, reference should be made to a paper recently prepared by ECLA's Industrial Develop-

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ment Division.¹ The present paper deals chiefly with research related to the use of raw materials.

But the problem of change of emphasis and direction in the policy of industrialization, away from the mere imitation of products and production methods used in the industrialized countries and in the direction of a firmer basis of technical research, also considerably affects those Latin American countries where industrialization is in a more incipient stage and where, as a result, the range of products susceptible of substitution is still broad. In fact, *per capita* income is usually low in these countries and a sizable proportion of the population is still engaged in subsistence agriculture. The main economic development problem is therefore the application of techniques to agriculture in order to make it more efficient and to enable the surplus rural population to be transferred to industry and services.

Substitution of some imports by domestic production, following the normal patterns which have prevailed in Latin America, means importing raw materials and accessories of all kinds for the new industry. Pressure on imports then increases as the population transferred from rural to urban centres begins to need manufactured consumer goods. The most suitable technological research in such cases is an investigation into the use of domestic materials, with a view to converting them directly either into exportable goods or into substitute materials acceptable on the international market. Next in order of priority would be the adaptation of the techniques known in other countries to raw materials and other existing factors of production. This would involve selecting and carrying out investment in activities designed to bring about industrialization depending as little as possible on imports of raw materials and other services.

The chief means of introducing new techniques in Latin America is foreign investment. While the element of innovation and stimulus which this contributes is undeniable, there are two main objections to placing exclusive or undue reliance on it: firstly, it tends to place domestic enterprises in an inferior position compared with foreign enterprises which establish themselves in the country since they do not have the same immediate access to modern techniques; secondly, undue reliance on foreign investment as a factor in the technical revolution required in Latin America might, in some cases, introduce industrial methods and procedures which, though perfectly satisfactory in the conditions obtaining in the countries of origin, would not be suitable in the countries to which they are transferred.

Within the framework of the requirements which technological research must attempt to meet in Latin America, other factors should perhaps also be mentioned. One of them is the shortage of expert staff capable of undertaking, in each industrial establishment, the research work of varying importance which often has to be done. Another is the need to improve control of the quality of raw materials and production procedures as well as finished articles. Fortunately, there are very few technical research institutes already functioning or being planned in Latin America in which either or both of these factors have not been considered. In fact, the two are directed towards a common purpose, namely to improve or maintain the quality of the product, a factor of undeniable importance,

¹ See "The Machine-Tools Industry in Brazil: background material for the programming of its development". (E/CN.12/633)

particularly if the future evolution of Latin America and the development requirements of the countries concerned make it advisable to reduce the degree of protection under which the industry operates in most of them — in many cases amounting to a virtual monopoly. Moreover, it must be emphasized that many of the staff who will have to be trained in some phases of industrial research and control must also be in a position to supervise production and improve productivity. There is ample evidence to show that Latin America has research institutes or laboratories engaged in the study of technological problems which, after achieving successful results, proceed to pigeon-hole their findings. This is nearly always due to the selection of the research subjects, which often have not been based on a study of the economic feasibility of the project should the proposed research prove successful. Moreover, even where a project is economically feasible, the institutes referred to do not possess sections engaged in an economic study of the new activity which may be established, let alone engineering services capable of advising potential entrepreneurs in the practical use of the procedures discovered.

In the circumstances, technological research in the less developed countries must perform a multiple and important function which goes beyond the advantages and goals it has wherever it is pursued. On the one hand, it must offer local entrepreneurs the same tool with which to introduce innovations and advanced techniques as is available to foreign entrepreneurs, so as to improve their competitive position with respect to the latter and to provide, as far as possible, accurate estimates of the profitability of the proposed enterprise and the necessary plans and designs; on the other hand, it must adapt industrial technology to the local conditions as found in the less developed parts of the world and thus make its introduction more effective.

The above fully justifies the serious interest shown in many Latin American countries, both by Governments and by industrialists, in the problems of technological research, leading to the establishment, or proposals for the establishment, of new organs to study the subject. At the same time, the international organizations concerned with applied technological research — for example, ECLA, OAS, UNESCO, FAO and others — have paid a great deal of attention to these problems and their executive organs have adopted a number of resolutions recommending their respective secretariats to study the present position in this field and prepare projects designed to increase and intensify such research. At the time of writing (February 1963) the United Nations Secretariat is holding a conference at Geneva on the application of science and technology for the benefit of the less developed areas. On the basis of official documents submitted by Governments, the conference will consider the action being taken and the approach being made by many countries to a series of important problems facing the developing areas.

All in all, it may be said that technological research activities in the Latin American countries are inadequate to cope with the problems to be faced. This is attributable to several reasons, the main one being the relative lack of tradition in this field and the shortage of properly qualified scientific and technical staff, an unavoidable state of affairs in new countries which are still on the threshold of industrialization. To these reasons must be added the lack of financial resources which derives,

in turn, from the current inability to appreciate the importance of the problem.

In fact, in Latin America technological research as applied to industry requires vast funds — far more than are so far available. However, if these funds are to lead to the effective achievement of the objectives sought, the formulation of a technological research policy based on a prior analysis of growth problems and trends in each country is essential. Hence, this research policy should come to be an integral part of economic development programming.

In principle, it might be argued that it is the entrepreneur himself who must introduce the techniques and know-how used in more advanced countries. In fact, however, the initiative in many cases cannot come from the entrepreneur. Even if the enterprises working in their respective fields in Latin America happen to be interested in having certain research work done, they very often simply cannot afford to do it themselves on an individual basis. Moreover, if the idea is to study the use of local raw materials different from those traditionally used, very often the interest of enterprises in the subject is only awakened once they are acquainted with the product, the procedure to be applied and the equipment to be used. Lastly, situations may well be imagined in which technological research calculated to produce findings of importance for the country's economy as a whole is at variance with the interest of certain specific groups, either because of the risk of producing a shortage of materials they now have no difficulty in finding for other uses, or because of the danger of losing their present markets.

The scope — and also the quality — of the research work being undertaken, is sometimes unfavourably affected by the shortcomings resulting from the lack of resources of all kinds. Quality is affected by other factors which can more easily be overcome — factors related to the lack of an effective link between the technological research institutes and the community they are designed to serve. The authorities in each country often do not have a broad picture of the problems requiring solution because of the sporadic and unsystematized nature of the contacts between the economic and industrial environments in which they arise and the government or university circles in which technological research is most often carried on. Technological research has often been carried out as an appendage university research of a speculative nature and as a means of supplementing the teaching of theory with practical training, rather than with the idea of catering directly for the needs of industrial circles.

In some cases the action needed to overcome the obs-

tacles to industrialization in specific sectors should be confined exclusively to technological research. In others, more than the mere introduction of technical changes and innovations will be needed to remove these obstacles. The Government should use the economic policy instruments at its disposal in order to undertake a campaign of guidance and encouragement with a view to channelling productive investment to those sectors. Thus, findings of much research work inspired by economic planning must revert to that same planning before it can be carried out.

For the purposes of the present paper, the complex nature of the problems involved and the vast coverage of technological research make it necessary to delimit the field of study, which will exclude the kind of purely scientific research which does not offer immediate prospects of productive investment even though their economic and industrial potentialities may be great. Similarly, and for the same reasons, research related to advances in agriculture, livestock, forestry and fisheries will be excluded. On the other hand, research designed to reconnoitre natural resources — aerophotogrammetric, geological, mining and water resources surveys — cannot be completely excluded from the study. While in principle they are outside its scope, circumstances may arise in which there is likely to be a close relationship between a definition of the topics of technological research required or recommended in a country and a more adequate knowledge of its resources in some sectors.

The main purpose of this paper is to provide a comprehensive picture of the problem of technological research applicable to the main aspects of the manufacturing industry in Latin America, with special reference to specific problems arising in certain industries. Special consideration will be given to a few countries — Argentina, Brazil and Chile — as being countries at a more advanced stage of industrial development where difficulties in the use of natural resources often become obstacles to a balanced acceleration of industrialization. Some points will also be discussed with respect to Paraguay in order to show that similar problems arise in the less developed countries, even though they have far fewer resources with which to overcome them.

This outline of the general problem is designed to provide a frame of reference for vigorous and effective action in the field of co-ordination and encouragement, both locally in each country and through international co-operation. Before offering some comments on possible future action in both fields, it may be well to outline some of the economically important problems facing several Latin American countries.

II. SOME TECHNOLOGICAL RESEARCH PROBLEMS OF ECONOMIC INTEREST TO LATIN AMERICA

1. PROBLEMS RELATED TO THE DEVELOPMENT OF THE IRON AND STEEL INDUSTRY

Iron and steel output in Latin America has increased at an extraordinary rate in the past few decades: from a total of nearly 170 000 tons² in 1930 output rose to 5.3 million tons in 1960 and is expected to be nearly 21 million tons by 1972. Some 3 or 4 million tons will nevertheless still have to be imported at that time. If, in achieving these figures, most of the steel plants continue to use conventional methods of steel production — coking

or charcoal oven, open-hearth plant or converter, and rolling with blooming and rolling mills, as has been the case in most Latin American plants³ — an investment of more than 5 000 million dollars will be required.

In addition to financing difficulties, a great many technical problems will arise concerning the supply of raw materials from the area. No such difficulty is foreseen with respect to the supply of iron ores, since Latin America is for the most part rich in iron ore deposits, many

² Expressed in steel ingots.

³ The exceptions are Hojalata y Lámina, at Monterrey, Mexico; Chimbote, in Peru and Orinoco in Venezuela.

of them of very high grade. The technical problems posed by iron ore are of a somewhat different kind, e.g.: (i) abandonment of the conventional reduction methods with a view to making more economic use of blast furnace coke or reducing its qualitative specifications; (ii) application of more modern methods together with other innovations — such as the use of oxygen converters in steel plants and continuous casting instead of blooming mills for rolling, which reduce the investment per ton of production capacity; (iii) introduction of economic development in areas off the beaten track — with reduction of transport costs through the exploitation of deposits which are too small for use by plants still operating according to the conventional processes, and application of the new procedures described under (ii) so as to reduce the minimum size of economically profitable plants. The break-even point for such a plant using conventional processes is around 250 000 tons a year, whereas it would drop to 60 000 tons or less if the new processes were used. The problem of the new reduction methods is dealt with in a separate section of the present paper.⁴ What must be done to achieve the additional objectives mentioned under (ii) and (iii) will constitute the basic agenda of a meeting held for this exclusive purpose under ECLA's auspices.

The position is much more complicated with respect to the supply of blast furnace coke because, apart from the deposits at Coahuila, in Mexico, and at Boyacá and Cundinamarca in Colombia — now supplying the steel industry in the countries concerned — there are no other known deposits in Latin America of coal directly convertible into coke.⁵

A third raw material for the steel industry the supply of which raises technological research problems is manganese, of which 7 to 8 kg. are required per ton of steel for refining. A few Latin American countries export manganese of a grade suitable for the metal industry,⁶ but the deposits are usually small and in many of them the usable manganese is found in broad veins of low grade ore. Much attention has been paid to the possibility of concentrating the latter, but the problem has not been solved and much remains to be done in this field.⁷

(a) *Coking of coals*

While some Latin American countries have coal deposits with very substantial reserves — so that the total amount of coal available in the area cannot be considered small — it is equally true that coal which can be directly converted into coke is scarce. The best known and largest deposits now mined for metallurgical purposes are: (i) the sabinas coalfield at Coahuila, in northern Mexico, which provides the coal for the production of the coke used in several non-ferrous metal smelting plants, in addition to the *Fundidora de Hierro y Acero* at Monterrey and *Altos Hornos de México*; (ii) a series of deposits located in the department of Cundinamarca and Boyacá in Colombia, which supply blast furnace coke to the *Solvay de Zipaquirá* soda plant and the *Paz de Río* steel plant at Belencito; (iii) several deposits — all of them with small reserves — situated at Oyón and Oroya, on both sides of the Peruvian sierra, and supplying the *Cerro de Pasco*

non-ferrous metal smelting plants. The remaining deposits in Peru consist of anthracite which cannot be coked. In practically all the rest of Latin America there is an abundant supply of non-cokable bituminous and sub-bituminous coal and lignite. The only remaining coal that needs to be mentioned is the *Barro Branco* coal from Tubarao, Santa Catarina, Brazil. This has extraordinarily high coking properties and, because of its expansion during carbonization, it cannot be used directly in the manufacture of coke but must be mixed with less strongly coking fuels which contract during the carbonization process. This makes Barro Branco the only known Latin American area near the sea with deposits of coal which can improve the coke manufacturing process. Unfortunately, the difficulty of mining this coal and the impurities it contains are such that for the time being it can only be considered a potential source. The remote location of the known deposits in Mexico and Colombia and the present problem of transporting the coal to the sea also militate against them as possible sources of supply for the steel industry in other countries.

The problem can be better appreciated if it is remembered that a very small proportion of the blast furnaces in the United States — about 10 per cent — use a single type of coal without resorting to mixtures. The chief difficulty in Latin America lies in the considerable distances between the steel manufacturing centres themselves and between these centres and the deposits of coking coal. This also applies, to a certain extent, to the steel industries in Utah and Colorado, in the western part of the United States. In those states, bituminous coal with a high volatile matter content is as abundant as in Latin America but the distance from the deposits of coal of a more strongly caking type — in Virginia and Pennsylvania — is enormous.

If the estimated expansion of the steel industry in Latin America is achieved by means of conventional processes, using blast furnaces, annual consumption of coking coal should be around 15 million to 18 million tons in 1972, and the foreign exchange expenditure, if only half this tonnage is imported, would be between 150 million and 180 million dollars.

The Latin American groups which have planned or are planning the construction of steel plants have quite properly given attention to the study of supplies of coal for reduction from sources situated as far as possible within the country itself. Prospecting carried out by the *Empresa Siderúrgica de Paz de Río* has resulted in the discovery of the deposits of coal at Boyacá which are directly convertible into coke. However, most of the large integrated steel plants in Latin America, particularly along the coast, have not completed their research and have actually suspended it when they found that the beneficiation required by local coal to make it usable would inevitably lead to a substantial increase in the cost of coke and would introduce a new factor of technical uncertainty in an already complicated organization.

It should be borne in mind that for reasons, which differ according to the particular deposit and need not be gone into here, local coal is virtually without exception more expensive than imported coal, even when the latter has recognized and normal coking properties. Without considering the specific case of Chimbote, in Peru, where over a million dollars was spent — with negative results — in a search for a process which would produce pre-formed coke from anthracite fines research had admittedly not

⁴ See section (b) below.

⁵ The only other sources are the small mines in the Peruvian sierra, which barely produce enough to supply the domestic non-ferrous metal industry.

⁶ With a manganese content of 42 to 46 per cent.

⁷ For more details, see (c) below.

been very extensive. As a rule, it has been confined to studies on the purification of coal and its behaviour in experimental coke ovens, either alone or in mixtures. When it was found that domestic coal did not produce a satisfactory coke unless it was mixed with imported coal, the research work was confined to determining in what proportions a mixture would provide suitable blast furnace coke using a minimum of imported coal.

Hence, it can safely be said that much remains to be done in the way of research on processes for beneficiating or preparing local coal which might be used in the Latin American steel plants so far supplied, wholly or in part, by countries outside the area. However, it is difficult to generalize in this respect, since the problems requiring solution vary from one plant to another and depend on the type of coal used. Therefore, all that is done here is to list a few processes which would be worth studying.

(i) The process of purification by separation of phases should be investigated in the case of coal presenting washing difficulties. The process, originally developed for lignite and sub-bituminous coal, was tested in Peruvian anthracite added to the manufacture of pre-formed coke briquettes. In Chile, the process was laboratory-tested for purifying sub-bituminous coal, very close to lignite, found in the province of Valdivia. A semi-industrial plant is being built in that area, although work has been suspended. The process consists of grinding the coal fine with a small quantity of oil. The resulting paste is washed with a small quantity of water and is then centrifuged to extract the liquid. Inside the damp paste, the coal particles tend to adhere to the oil whereas the gangue — which is more hydrophilous — adheres to the water. By separating the water from the oily mass by centrifuging, coal can be purified from a 20 per cent or more ash content to a 5 per cent or 6 per cent ash content. The fact that the purified coal is ground and mixed with a little oil may be an advantage for coking, as will be seen below under (iii). The resulting coke will almost inevitably be of the pre-formed briquette type.

Reverting to what happened in Peru, it is clear that by the simple process of flotation, the ash content of anthracite fines can be brought nearly as low as the level achieved in using the phase separation process. On the other hand, satisfactory coke briquettes were not obtainable in the coking oven constructed on a semi-industrial scale, either because of a defect in the design of the oven or because of the virtually complete absence of volatile matter in Peruvian meta-anthracite.

It would seem that the integral process — cleaning of coal by phase separation and manufacture of pre-formed briquettes — should be tested in Latin America with coal from the Turbio River, in Argentina, and might also be tried out in respect of the sub-bituminous coal deposits in Rio Grande do Sul, Brazil. As for Tubarao coal, its purification might be improved through the phase separation method, without moving to the subsequent stage — the manufacture of pre-formed briquettes.

(ii) Low-temperature distillation of bituminous coal difficult to coke — and even sub-bituminous coal which cannot be coked at all — produces a semi-coke which, when mixed with fresh coal of low caking property, considerably improves the coking characteristics of the mixture. This process might be considered in Chile with the idea of using domestic coal as a substitute for most of the 20 per cent which now has to be imported for the blast furnace at Huachipato.

(iii) Tar pitch or petroleum asphalt pitch, added to some types of coal — even sub-bituminous coal often produces an improvement of the caking properties of these types of coal. This process should be considered with respect to various types of coal in Latin America, with or without the addition of semi-coke, and according to the process described earlier.

(iv) While this is clearly a problem not very likely to be solved with respect to Peruvian anthracite, an attempt might well be made to produce coke by adding asphalt as well as other coal with a higher volatile matter content and reactivity. Chilean coal from the Schwager and Lota mines, particularly in seam 5, might produce good results, in view of its unusual reactivity if washed at a density of not more than 1.34.

(v) Several of the procedures described seem to point to the advantage of manufacturing coke briquettes (pre-formed). If porosity and reactivity seem inadequate, an attempt might be made to produce briquettes having a surface area larger than the conventional ones (which are usually spheroid or ovoid in shape), perhaps in the form of small hollow cylinders.

(vi) A petrographic study of all the Latin American coals capable of being used in metallurgy would be most valuable. Simple mechanical processes can be found through which the petrographical components more susceptible of coking may be concentrated by removing, for instance, much of the attritus whose presence increases the fragility of the coke.

(vii) A useful purpose might also be served by studying the mixtures of local coal of varying and possibly complementary characteristics which might, if an exchange were made among the different countries of the area, produce a good quality of coke. In this connexion, the great variety of coal in the Valle del Cauca deposits in Colombia might usefully be studied.

Most of the studies mentioned are costly and it is therefore unlikely that the present steel industry will decide to carry them out, particularly if they are almost inevitably bound to raise the cost of coke to the blast furnace. It might perhaps be a task for Governments, on the advice of their economic planning agencies, to evaluate the two opposing factors involved: on the one hand, a variable increase in the price of steel, with its unfavourable repercussions on economic development and, on the other hand, the continuing expenditure of foreign exchange for the financing of imports of solid fuel. If it should be decided in favour of the study, the question of financing would have to be considered, since there are very few cases in which the Latin American coal industry would be in a position to provide the funds, even though it would be the first to benefit.

(b) *Iron ore reduction*

Some Latin American countries have iron ore deposits that are both abundant and of very high grade, and the countries in question — Brazil, Chile, Cuba, Mexico, Peru and Venezuela — export varying amount of the ore. Consequently, there are reasonable grounds for assuming that there will be no difficulty in supplying the iron and steel industry planned for Latin America with these raw materials.

Nevertheless, in the case of many of the deposits mined for export the part of the ore crushed during extraction, and consisting to a varying extent of very fine grained matter, represents a problem. If acceptable at all on the

world market, this type commands a much lower price than ore in lumps. This raises the technical question of how to make extraction operations more economic in this type of deposit. In some parts of the world, the methods of *briquetting* and *pelletizing* fines are being used, and it would be worth-while to study their economic advantages and the technical possibilities of adopting them.

In addition, in the more industrialized countries the idea is being mooted of using a *mixed self-fluxing charge*, i.e. of *pelletizing* the iron ore through the use of coke, with or without *fluxes*. This may prove to be the solution to the problem of obtaining suitable coke from local coal for blast furnaces in Latin America. A number of new methods relating to different phases of iron and steel making have been studied and experimented with lately but have not given consistently good results in practice. For the purposes of this paper, it will be enough to mention the following cases:

(i) With respect to ore reduction, attempts have been made to replace or complement the blast furnace — which uses *blast-furnace coke* for reducing the iron oxides and melting the resulting metal until it becomes liquid pig iron — by direct reduction processes. These make use of natural gas, coke breeze, other carbonaceous substances or hydrogen. They produce spongy iron, *luppen*, etc. in solid, *pasty* or liquid form, with a residue of iron oxides and different kinds of slag. According to their structure and type, these products can be used directly as synthetic scrap in the steel-making furnaces, charged into blast furnaces, smelted in simple *cupola furnaces* and so on.

(ii) As regards steel making, various methods based on the use of converters for blowing oxygen or air enriched with oxygen have been applied. On the one hand, the steel thus obtained from the converters is no way inferior in purity to the steel produced from basic open-hearth furnaces and, on the other, a substantial proportion of solid material can be refined.

(iii) Lastly, in so far as rolling is concerned, the method of continuous casting is rapidly becoming more popular both for new mills and for the expansion of those already in existence, since either billets or slabs can thus be obtained directly from the steel-making furnaces and need only a few additional *passes* on the rolling-stands to be given their final shape. The costly blooming mill can therefore be dispensed with and frequently the *intermediate stands* as well.

The procedures and mechanisms indicated in paragraphs (ii) and (iii), are to be given extensive consideration at the ECLA meeting referred to, and will not be discussed in detail here. It will simply be stressed that the combination of all three elements mentioned enables steel-making plants to be planned with a much smaller investment outlay than integrated mills and also reduces their scale of operation fairly considerably, thus making for the establishment of small integrated industries that are economic to operate. The use of oxygen converters and continuous casting does not, of course, have any influence on the choice of reduction method, and both are perfectly applicable to the subsequent processing of the blast-furnace pig.

The only problems that will be dealt with here then are those with a bearing on direct iron ore reduction. This reduction may have several aims: (i) to reduce and eventually eliminate the iron and steel industry's dependence on blast-furnace coke, and to replace normal

coke, with its requirements as to grain and crushing strength by such reducers as coke breeze, coal, charcoal, natural gas or other hydrocarbons: (ii) to produce synthetic scrap, which might be advantageous depending on the market price of ordinary scrap;⁸ (iii) to lower the economic scale of production since many of the units employed in direct reduction are small and an increase in output can be obtained simply through the addition of a number of independent units; and (iv) in the majority of cases, to reduce the normally substantial investment required for blast furnaces and coking plants.

There is no doubt as to the overwhelming importance of these techniques for the economic development of Latin America. In fact, they make it possible for the first time to work some medium of small-scale deposits that would be un-economic to exploit by the techniques established in the programming of the project. With these techniques it is difficult to obtain acceptable prices for steel unless annual output is close to 250 000 tons at least. As from the outset there must be a volume of ore sufficient for a minimum exploitation period of twenty years, if the ore has a grade of, say, 50 per cent, the initial amount to make it worth while establishing an integrated mill on the basis of classic techniques will be 10 to 12 million tons. If the new techniques are used, however, it would be economically justifiable to set up a small integrated mill with an annual capacity of not more than 50 000 to 60 000 tons. This would enable deposits with about 3 million tons of ore in the first instance to be worked economically.

Much has been done to foster the development of direct reduction methods and more than 100 patents have already been taken out in the industrialized countries for inventions with this aim. At least a score of these methods have been tried out in pilot plants, and a few have been applied on an industrial scale and are now in use.

The first studies concerned processes that used solid carbonaceous materials, such as coke breeze, anthracite, coal and charcoal as reducing agents. Then emphasis was laid on the processes making direct use of natural or producer gas for reduction purposes, and lately a growing interest is being taken in the method of increasing the hydrogen content of the gas through cracking. Some of the more recent processes have produced admixtures of hydrogen, carbon monoxide and other gases, in which up to 90 per cent of the reducer gas consists of hydrogen. Although these are the main trends followed by research, some variants on the more common processes are also being investigated in isolated cases. For instance, if some carbonaceous material in the gas producer is gasified by the substitution of oxygen for air, the reducer gas is directly injected into the iron ore in the form of a blast of pulverized ore.

The main differences in the procedures that use the same reducing agents are: (i) the fact that some are continuous and others intermittent; (ii) the design of the blast furnaces and the contact surfaces between the ore and the reducing agent; and (iii) the temperatures and pressures at which reduction takes place.

The technological progress that has led to this kind

⁸ This would also be useful when scrap of a uniform kind is needed, e.g. for the production of special steels, or when the aim is simply to cut the transport cost of iron ore for the iron and steel industry; this would apply if the ore were of medium grade, transport long and difficult and natural gas or cheap power obtainable in the neighbourhood for use as reducing agents.

of research has eventually meant that each process is developed almost entirely in one research centre, thorough investigation in more than one place or by more than one research group being very rare indeed. Consequently each of these centres has accumulated a vast amount of experience with respect to a particular process and has the proper technical equipment — including pilot furnaces — to do the work. In these circumstances, there is no justification for establishing a similar research laboratory of this kind in Latin America, especially as different equipment has to be used for every method investigated.

Another factor that should be taken into account in deciding upon a research programme of this kind for Latin America is that some of the processes have been devised for specific conditions, mainly the characteristics of the ore but, in some cases, its availability of different reducers and their relative prices. The fact is that, although some procedures can be applied to a wide range of ores, others are suitable for particular kinds only. Since the cost and availability of the other elements involved also have to be borne in mind in selecting a procedure the range of choice in each case is clearly rather narrow if it is really intended to operate in the most economic way possible.

At the present time, anyone interested in the possible use of a little-known ore and anxious to know whether it can be worked by any of the direct reduction processes will find himself in a very difficult position. The number of factors and considerations involved in the choice of procedure is so great that he will usually need some kind of technical advice or he may simply contact those who handle the particular procedure they are best acquainted with. In these circumstances the reduction process favoured by the firm approached may not always be the most suitable for the treatment required by the ore in question.

The groups that can be approached and that sponsor the various methods may often be uncertain whether the ore is suitable for treatment by their particular system. And, although they may, in their heart of hearts, believe that others would be better, even so the temptation to undertake new studies is almost irresistible. In such cases, the general rule is that the person concerned defrays at least the direct cost of the tests and, in this way the consultation enables the sponsors of the method to acquire greater knowledge and experience of a larger number and variety of ores. The information they give the interested person is undoubtedly trustworthy, but even so the main query is still left unanswered, namely which of the many alternatives available is the most suitable process for the particular ore in question.

Thus it is clear that there is an urgent need for technical assistance and technological research in this field in Latin America. What must be done is to make a thorough examination of the ores beforehand, in order to determine their characteristics as accurately as possible and indicate the reduction processes that at first sight, seem to be the most appropriate for treating them. This analysis should be supplemented by an examination of the other productive factors available, and of the kind of product that is to be manufactured. Once the whole study has been completed, the research centre responsible for it would be able to give advice to anyone requesting it on the next steps to take.

Accordingly there seems to be every reason for encouraging technological research of this kind in Latin America. In view of the need for personnel experienced in iron ore research and the advantages of reducing invest-

ment in equipment, it would be advisable to concentrate studies of this kind in a single centre which would be constantly at the disposal of interested Governments and industrialists.

It is easier to understand the importance that pilot experiments in the centres which devise the processes should start out well, if it is remembered that they need a great deal of time, that occasionally they may even have to be repeated in different centres, and that a knowledge of the findings is essential to enable the interested parties to take the next step.

If it were decided to create an institute of this kind, the first task devolving upon its technical staff would be to make a detailed study of accepted direct reduction methods and to classify them in accordance with their principles of operation or with the particular characteristics they presuppose in the ores they are able to process.

A systematic review would then have to be made of the reductibility and other properties of Latin American iron ores, and of course, of the other raw materials needed for the iron and steel industry that are available in each area.

These systematic studies would be interrupted if requests were received for specific studies of samples from convenient situation deposits large enough for their exploitation to be a reasonable proposition, either for export purposes or for feeding a projected steel mill.

The research centre would thus first verify the volume of the resources and explore possible markets for the products and then ascertain the morphological and physiochemical characteristics of the ore, particularly its reductibility. Technical research would include a complete chemical analysis of the ore; determination of its fusion or melting point, as appropriate; its mechanical characteristics at different temperatures; its reductibility or reactivity to different reducing agents, etc. If necessary the possibility of purifying or *beneficiating* the ore prior to the reduction treatment should be studied at the same time. With these data in hand, the centre could indicate the most recommendable reduction procedure or procedures. Any further work would be done in the centres that had developed the relevant processes but only if at that stage it was felt that it would be worthwhile to use the ore.

Although fairly comprehensive studies have been made of ores from numerous deposits in Latin America, there are many more that have not been examined at all or else very superficially. In a few cases, the owners of the deposits have defrayed the cost of such studies, but in most cases, the ownership of or rights to a deposit had originally been acquired by a powerful economic group interested in the creation of an iron and steel industry. Considering the industry's enormous investment requirements and Latin America's financing capacity in general, it is obvious that Governments must continue to take an interest and play a part in new ventures and the expansion of existing plants. It should be remembered that investments for the next ten or twelve years in this branch alone in Latin America are estimated at about 5 000 million dollars.

In these circumstances, it is only natural to hope that — except in isolated cases — the initiative in such research will be taken by economic planning organizations or other government agencies, once the economic feasibility of the projected iron and steel industry has been investigated.

(c) Concentration of manganese ore

Manganese is essential for steel refining, although its specific consumption by the industry is only in the range of 7 to 8 kg per ton of steel ingot. As it seems likely that some 20 million tons of steel will be produced annually in Latin America at the beginning of the next decade, it may be assumed that approximately 160 000 tons of manganese metal will be needed which at an average grade of 40 per cent, correspond to about 400 000 tons of ore.

At first sight, the prospects would not seem to be disquieting, since the following quantities were exported by some Latin American countries in 1960:

	Tons	Average grade (Percentage)
Brazil	468 465	45.7
Chile	14 372	43.9
Cuba	36 079	40.0
Mexico	190 300	40.5
Total	709 216	

But the question is important for the following reasons:

(i) as reserves are also limited in the United States, Canada and Western Europe, steel production in the Western world is largely dependent on imports from Asia, and in particular the Soviet Union, where manganese deposits are most abundant; (ii) in various Latin American countries the deposits are of such low-grade ore that it is unacceptable on the world market for metallurgical purposes where it has first been beneficiated in some way to raise its grade. If the deposits could be mined for export those countries could increase their foreign exchange earnings through the addition of a new export item.

Two facts will suffice to demonstrate the importance attached by some Latin American Governments to the problem: (i) in 1960 the Government of Venezuela gave the State the sole right to explore and exploit manganese deposits; and (ii) also in 1960, the State of Minas Gerais, Brazil prohibited the exportation of manganese from deposits located in its territory.

It is known that sizable reserves of low-grade manganese ore exist at least in Argentina, Brazil (State of Minas Gerais) and Chile, and it is quite possible that, once an economic method of concentrating manganese ore and making them a sound market proposition has been discovered, interest will be aroused in conducting explorations in other Latin American countries, in many of which such deposits are said to exist, although thorough preliminary geological and mining studies have not yet been carried out.

The generic term "manganese ore" comprises a large number of different compounds which appear in various forms and have been produced in different ways. If not all, the majority present very serious technical difficulties for normal flotation processes.

A typical case is that of Chilean ore, which has been extensively studied by private companies. Manganese in Chile is usually found in thin layers of high-grade ore (42 to 45 per cent), among thicker low-grade strata (5 to 35 per cent). Selective working of the richer layers is costly and difficult since, apart from the difficulty of extracting the inert and low-grade matter, there is the possibility of finding a mixture, which reduces the percentage of manganese in the ore obtained.

Mass exploitation by mixing layers of different grades,

raises productivity and reduces costs, but makes it essential to concentrate the product in order to leave it with an adequate manganese content. Research undertaken demonstrates that it is technically feasible to concentrate these ores simply by flotation, but because of their porosity large amounts of non-recoverable reagents have to be used, which makes the method un-economic. Moreover, Chilean manganese ores are usually oxides containing sizable amounts of silicates and limestone, which impurities preclude the production of ferro-manganese by recognized methods. Lastly, several methods of gravity concentration have been tried out, i.e. by means of the Wyflex Table or separation in an aqueous solution. The ensuing yield has been very low and the methods have also had scant success when tested in the United States.

In view of these problems and the interest felt in increasing high-grade manganese production, the following steps should be taken:

(i) To exhaust the possibilities of concentration tests by density differences and by flotation on the same lines as the methods used in other countries with ores of this kind;

(ii) To study the possibility of roasting the manganese ore in order to reduce all the compounds contained in the metal to oxide (MnO_2), thereby making it easier to concentrate by ordinary methods. The disadvantage of this process is that the resulting concentrate pays a much higher import duty on entry into the United States. Hence, if the results of this research are satisfactory, the Latin American Governments which are to benefit from the use of the method should negotiate a reduction in the duty with the United States;

(iii) To study the technical and economic possibilities of producing electrolytic manganese metal, which is 2.5 to 3 times higher in price than the oxide in the concentrate. This study would call for the use of complicated techniques and should be accompanied by a market study, since current demand for manganese in the form of electrolytic metal is today much lower than the demand for oxide in ores or high-grade concentrates.

As may be gathered, the research that would have to be undertaken in each case would require a substantial outlay of funds and highly specialized staff, unless the research group were lucky enough to find some economic method of direct concentration without undue difficulty. Furthermore, if the technical solution discovered is on the lines of paragraphs (ii) and (iii) above, it should be complemented by negotiations on the part of the interested Governments with the United States to obtain more favourable tariff treatment for the product. In these circumstances, it would seem advisable for research to be concentrated in one centre so that the staff can specialize in this kind of work and any decisions bearing on commercial matters can be postponed until an economically profitable technique has been discovered for the alternatives of roasting or electrolysis. It seems unlikely therefore that all Government intervention can be dispensed with, at least during some of the more complicated and costly stages of the work. An examination of the possibilities of concentration by the usual methods could, on the other hand, be financed easily by the owners of the deposits, who would apply directly to the centre.

If a single research centre were set up, one of its first tasks should be to compile data on the deposits that, after due geological and mining studies, have been proved to contain enough ore to justify their exploitation. Their

second task would be to study and classify samples of the deposits in order to identify the salient problems for the Latin American countries and gradually study them, as far as possible, in order of importance. A third task would be a systematic study of the problems presented by all the ores of which representative samples are available. Lastly, the centre should co-operate in the preparation of an inventory of all manganese ores in Latin America, indicating characteristics and possible reserves.

2. SUPPLY OF SULPHUR AND SULPHURIC ACID

The overwhelming bulk of the sulphur consumed throughout the world goes into the manufacture of sulphuric acid, the basic raw material *par excellence* for practically the whole chemical industry. Moreover, most of the sulphuric acid produced in Latin America is derived directly from sulphur, which means that the other sources referred to in this section represent only a very small item in the world economic picture.

Unfortunately, with the exception of Mexico, Latin America is generally poor in sulphur deposits,⁹ and most of the demand must therefore be met through imports. Thus, out of a total apparent consumption of 380 000 tons in all the Latin American countries, 172 000 tons are imported from the United States and 14 800 tons from Mexico. It should be pointed out that Mexican exports to third countries amount to 1 176 000 tons.

In view of the fact that Latin America, as may be seen from the above figures, has a very positive foreign trade balance with respect to sulphur, it may appear at first sight that technical problems which may arise in connexion with sulphur mining are of little interest to the net sulphur-importing countries of the area. However, because of the close connexion between the availability of sulphur, or more exactly of sulphuric acid, and the development of the chemical industry in general, serious consideration has been given to these technical problems. The reasons for the concern have probably been essentially the following: (i) the desire to ensure continuity of supply; (ii) balance-of-payments problems related less to the cost of importing sulphur than to the possibility of exporting sulphur obtained by processes other than the Frasch method; (iii) the disturbing cost of sulphur. The truth is that the above considerations were not always formulated or, if formulated were not always evaluated in the same way. Hence, there are cases of undue protection of national mining aimed at ensuring the supply, with a resulting increase in the price of the product.

In Latin America sulphur appears in at least five quite distinct forms: (1) cupola deposits, susceptible of being developed by the Frasch process; Mexico produces around 1.2 million tons annually from this source; (2) volcanic sulphur, in abundant supply in the high peaks of the Andes and found in varying amounts and formations in Argentina, Chile, Bolivia, Peru, Ecuador and Colombia as well as in Mexico; from these deposits some 50 000 to 60 000 tons annually are produced, chiefly in Argentina, Bolivia, Chile and Colombia; (3) sulphur contained in iron or copper pyrites, some 4 000 tons of

which are extracted annually in Venezuela and around 15 000 tons are exported annually by Cuba; vast quantities of pyrites exist in Brazil, which has no other source of sulphur, but so far there has been no industrial exploitation; (4) sulphur contained in acid flue gases, both from petroleum and from ore calcination; Mexico has an annual production of 30 000 tons of sulphur from this source, and Argentina produces annually some 20 000 tons, while Uruguay intends to set up a unit with an annual capacity of 4 000 tons; it should be pointed out that Chile, in spite of the concentration of sulphur in its great copper foundries, does not recover any of it; (5) native sulphur, very finely pulverized, mixed with the sediment found at the bottom of some Central American lakes, chiefly in Guatemala. It seems that technological difficulties in the mining have prevented this type of deposit from being industrially developed.

Some of the resources mentioned present no technological research problems whatsoever, while others give rise to very serious problems. However, in all cases the type of research required varies essentially from one case to another. The present position is reviewed briefly below, the various sources being listed not in order of economic importance but on the basis of the problems to which they give rise, beginning with the simplest and ending with the most complicated.

(a) *Deposits to which the Frasch process can be applied*

This process, consists of inserting three tubes, one inside the other, into the bed of native sulphur found underground, the solid sulphur being extracted by means of (i) super heated steam injected through one of the tubes in order to melt the underground mass; (ii) a tube to draw off the liquid sulphur; (iii) a third tube filled with compressed air to create the necessary pressure in the sulphur deposit to bring it to the surface. This is a well-known technical process which presents no problems and requires no research other than measuring the size of a deposit so as to ensure that it is sufficient to amortize the installations.

(b) *Volcanic sulphur*

This appears in solid sulphur ore formations of varying size, on the slopes of certain volcanoes, mostly extinct, and usually at an altitude of over 4 000 metres above sea level. This sulphur is closely intermixed with a high varying proportion of gangue, chiefly quartz and alumina, which causes the grade of the ore to fluctuate between 15 per cent or less and 90 per cent. As a rule, the work done at the altitude at which the sulphur is found is confined to mining the ore, which is immediately transported to a lower level where there is a water supply and facilities for setting up the concentration and/or refining plant. Apart from the problem of water, which is scarce along the slopes of a volcano, and the cost of transporting the fuel, the higher productivity of the labour force at lower altitudes will influence the selection of the site for the beneficiating plant. Over the past twenty years the practice has become general to concentrate the sulphur from the ore, by flotation, at grades of between 65 per cent and 86 per cent. In most cases these concentrates can be directly used in the production of sulphuric acid, and this is not being done at the *Sociedad Metalúrgica Meteor* plant at Zarate, Argentina, in order to supplement the raw material it obtains from heating lead and zinc

⁹ Some years ago it was rumoured that formations similar to those developed in the United States and Mexico for direct production by the Frasch process had been discovered in Venezuela. This was never confirmed, however, and the size of the deposits is not known.

sulphide. However, since this depends on the nature of the gangue left in the concentrates, it is not always feasible, and if use of this method is likely to be of economic interest it should be studied in each specific case. Moreover, not all ores are equally suitable for flotation, and careful research should be undertaken, in the individual case, into the best flotation methods and reagents. The usual procedure is for the concentrates to be treated immediately in autoclaves or retorts heated by steams to a temperature above the melting point of sulphur. The sulphur then separates, either wholly or in part, from the gangue, and once the separation has been completed, it can be extracted in liquid form.

With respect to the operation of autoclaves, two different techniques are now being studied and compared. The older and more widespread seems to be based on research work done in the thirties by the *Caja de Crédito Minero de Chile*, as it was then while the more recent is the technique used in volcanic sulphur mining in Japan, and made known in Latin America by Professor Kitaro Hayase, a United Nations expert who worked in Argentina, Chile, Colombia and Peru.

The older process consists of charging the retorts with concentrates which usually retain a small percentage of humidity, and heating them by steam. When all the sulphur has melted and there has been time to separate it from the gangue by gravity, the liquid sulphur with a degree of purity of over 99 per cent is drawn off, and also the viscous substance constituted by the gangue, which still retains 20 per cent or more of sulphur. This "glue" is returned to the flotation plant together with fresh ore, and the cycle is thus completed with an appreciable recovery of sulphur extracted from the mine.

Under the Japanese process, the concentrates are fed into a special type of autoclave, equipped with revolving blades which turn slowly, with an abundant supply of water. The process is based on the fact that the ore forming the gangue has a marked affinity for the sulphur, which adheres to the gangue once the melting point has been reached, and this is why suitable separation cannot be achieved by the dry process. On the other hand, the gangue itself has a greater surface affinity for water, which replaces the sulphur in contact with the gangue, and a virtually complete separation can be achieved. The purpose of the revolving blades is to keep the mass moving slowly all the time, in order to allow the particles of molten sulphur to make contact and gain the necessary weight and volume to facilitate separation from the gangue.

The Japanese process apparently achieves greater recovery of sulphur extracted from the mine and makes it possible to work with concentrates of much lower grade than those required by what might be called the "conventional" process in Latin America. On the other hand, it has the disadvantage of being more costly to install. The thermal balance of either process may possibly not be the same, and this is an important consideration in view of the cost of carrying fuel to an altitude of more than 3 000 metres and to remote areas.

It would seem from the above that once the volume of the ore, its average grade and the grade of the masses in more abundant supply are known, the following research would be warranted in all cases: (i) a study of the most suitable flotation systems and the best reagents; (ii) a comparison of the technical results of the conventional, the Japanese and other processes worth con-

sidering; (iii) once the results which can technically be achieved using different mining methods are available, a comparative economic study of these results. Apart from studies of mining procedures, research might be undertaken to determine which metals are most suitable for use in the manufacture of retorts, since the cast iron used for this in Chile corrodes easily and has a short life. Moreover, operation of the conventional autoclave is most inefficient from the standpoint of labour productivity, since much more time is required for loading and unloading the retort than with the processes of melting and separation. More practical designs or those providing for a greater degree of automatic operation should be studied.

(c) *Extraction of sulphur from pyrites*

In Venezuela some 4 000 tons of sulphur are apparently extracted annually from pyrites. However, since the collection of data for this paper was confined to the four countries mentioned in the introduction, that is all that is known. Cuba, for its part, has regularly exported some 30 000 tons of pyrites per year, with a sulphur content of some 15 000 tons. In view of the fact that the world output of sulphur obtained from this source amounts to some 8 million tons, contained in nearly 19 million tons of pyrites, and that over thirty-five countries produce this tonnage, it may be assumed that a great variety of techniques exist for winning the sulphur contained in pyrites.

Brazil has a serious research problem in this field. Although the country does not appear to have any sulphur source of its own other than its pyrites, these are not industrially exploited. The point is that Barro Branco coal contains an unusually high percentage of sulphur which fortunately is not organic but pyritic and can easily be eliminated by gravity (washing in a dense medium) until it is reduced to a little over 1 per cent. The present method of washing produces some 40 per cent of metallurgical coal, 30 per cent of a poor or middling fuel, and 30 per cent of pyritic gangue. In view of the fact that the pyrites contained in Barro Branco coal represent approximately 12 per cent of the weight of the coal, with 5 per cent of recoverable sulphur, it is not inconceivable that in the near future, as coal production develops to meet the expected expansion of the iron and steel industry, some 150 000 tons a year of recoverable sulphur will be available.

However, the use of these pyrites for the direct production of sulphuric acid by the processes applied throughout the world is not feasible for Brazil, since the acid would have to be transported by sea over great distances — Santos, Rio, Vitória, etc. — and this is out of the question.

There are two main objections to the transport of pyrites: (i) the fact that 50 per cent of the material transported does not consist of pyrites; (ii) propensity to oxidation and spontaneous combustion. In the circumstances, two kinds of research might perhaps be recommended, one directed at the discovery of a process which would prevent spontaneous combustion of the pyrites, and the other a study of a process for extraction of the sulphur from the pyrites which could be installed next to the mines. With respect to the latter, some research has been undertaken without reaching a solution which appears acceptable at first sight.

(d) *Extraction of sulphur from calcination and combustion gases*

In Mexico, some 30 000 tons of sulphur are extracted from petroleum refinery gases, in Argentina some 20 000 tons from the gases produced by the calcination of lead and zinc ore, and Uruguay intends to set up a plant to produce some 4 000 tons from petroleum refinery gas. Chile which has a large output of raw material of this type, does not make use of it. Santiago is the centre for the consumption of sulphuric acid in the country. Some 150 kilometres away by rail, there is the great Braden Copper Company foundry, at the El Teniente mine, which produces some 180 000 tons of copper annually and should obtain, as a by-product, sulphuric acid with a content equivalent to some 30 000 tons of sulphur. Yet, Santiago uses sulphur from the deposits in the north which is costly and has to be carried over great distances, no doubt to avoid causing loss of employment among the miners of the area. Moreover, the Chuquicamata and Potrerillos copper foundries waste at least twice as much sulphur as Braden. There is also the sulphur from the Las Ventanas foundry, near Valparaiso, with an estimated annual output of approximately 45 000 tons of copper.

If the problem is put in this way, it hardly seems necessary to undertake any technological research with respect to the potential output of sulphur from El Teniente and Las Ventanas — the equivalent of an annual total of 40 000 tons of sulphur, since the transport of sulphuric acid to the consumption centre would be over a short distance only. On the other hand, with respect to the much greater output of Chuquicamata and Potrerillos, a problem would arise similar to that of the Tubarao pyrites, i.e. how to find an economic method of direct extraction of native sulphur, in this case, from the gases produced by the calcination of sulphurized copper ore. The known processes for doing this are complicated and costly, but it is unlikely that much research has been done since there must be a few cases in other countries of calcination as far removed from any industrial activity as in Chile.

(e) *Sulphur from lake sediment*

Since sulphur from this source is found in only a few countries, and these are not included in the present study, detailed information on the progress achieved in the technique used for obtaining it was not collected. This is very fine native sulphur, mixed with a high percentage of material from the bottom of lakes, chiefly clay in the colloidal state form. Until a few years ago no method had been found of subjecting this material to flotation for the purpose of enriching its sulphur content. Nor is it known whether the possibility of extracting this sulphur economically through the use of solvents has been studied.

To sum up, the different kinds of research which might be recommended with a view to solving all these problems would be the following:

- (i) *Flotation of ore* (volcanic deposits and lake sediment);
- (ii) *Direct production of sulphuric acid on the basis of concentrates* (volcanic ores and lake sediment);
- (iii) *Extraction by means of solvents* (lake sediments and, possibly, volcanic ore);

- (iv) *Economic comparison of various types of retorts* (volcanic ore and lake sediment);
- (v) *Technical details of retorts — metals and output* (volcanic ore and lake sediment);
- (vi) *Spontaneous combustion of pyrites* (Brazilian pyrites);
- (vii) *Production of native sulphur based on sulphides* (Brazilian pyrites and copper calcination gases in Chile).

The above list shows that there is room in Latin America for two or three sulphur research centres, dealing with problems almost entirely independent of one another. As to the question of who should promote and finance such research, and its possible results, the following remarks may be made:

Volcanic sulphur. Research should normally be financed by the owners of the deposits — as being the chief interested parties. Obvious exceptions would be: (1) where the country itself has an over-protected market and the owners of deposits can operate on a profitable basis without improving mining processes; (2) where it is known beforehand that, however satisfactory the findings of the research, imported sulphur will still be cheaper than domestic sulphur; (3) where the owners of deposits cannot afford to finance research work. In any case, if the problem seemed likely in any way to affect the country's economic development potential, it would be a matter for development agencies to promote and help to finance the research work.

Pyrites. In Brazil the National Coal Board has done some research — although this has been by no means exhaustive — on the winning of sulphur from pyrites. In view of the growing demand for sulphur in Brazil and the prospect of increased coal mining (with a corresponding increase in the production of pyrites), if the Board cannot find sufficient funds to carry on with its research, it could be financed through the joint action of development agencies and the iron and steel industry, which would be the first to benefit from cheaper coal prices, which would be achieved in some measure by exploiting one of the by-products of coal.

Calcination gases. The problem faced by Chile may well exist in mining countries such as Mexico and Peru. In Chile, producers of volcanic sulphur enjoy adequate protection and can ignore the problem. Except for the small Las Ventanas foundry, this is also true of copper products, since they are large foreign companies which operate under a quite complicated institutional and fiscal régime and would thus prefer not to have anything to do with the problem. Hence if research were really desired, the development agencies would have to make themselves responsible for it.

Lake sediment. Some owners or concession-holders exploiting these resources have financed research work which apparently could not be completed. If this was due to shortage of funds, here again development agencies might promote the work still to be done.

3. PROBLEMS RELATING TO OILS AND FATS

Oils and fats play a very important part in the Latin American economy. In recent years, nearly 8 million hectares have been given over to the production of oil-bearing crops, i.e. approximately 8 per cent of the arable land. Animal fats are a major by-product of the livestock

industry and are largely destined for human consumption, while a not inconsiderable proportion are used in industry for the manufacture of soap, paint, varnish and candles, etc. Most of the Latin American countries are able to produce some kind of essential oils which, although not in great demand on the export market, command high prices.

Latin America produces almost every type of edible and industrial fat used in the world. The south-eastern region, comprising Argentina, Uruguay and part of Brazil, is one of the main centres supplying fat products for industry — linseed oil, castor oil and non-edible fats. It also produces large amounts of vegetable oils and edible animal fats. On the other hand, nearly all the remaining Latin American countries produce oil and fats primarily for the home market and have a net import balance.

Before the Second World War, Latin America not only supplied the bulk of the oils and fats it consumed but its exports exceeded imports by nearly 500 000 tons, approximately a third of production. Latterly, imports have exceeded exports by nearly 100 000 tons a year, that is, by about 6 to 7 per cent of the annual output. The transformation of Latin America from a net exporter to an importer has been due to increased consumption of oils and fats in every country and also to the decline in Argentina's exports. Argentine farmers, discouraged by the Government's price policy applied in the middle of the last decade, reduced the area planted with oil-bearing crops, and have not yet regained pre-war production levels.

Conditions are favourable in nearly all the Latin American countries for expanding the production of oils and fats, and reducing imports or increasing exports. Even so it is no easy task to increase exports, since to do so, the rate of expansion of production would have to exceed 5 per cent yearly — the present rate of growth of demand.

In spite of the steady upward trend of oil and fat consumption, *per capita* intake in Latin America is low in comparison with other regions. FAO has published the following estimates in kilogrammes of apparent *per capita* consumption of all oils and fats: Latin America, 10.8; Western Europe, 23.8; North America, 29.4. Hence, there is a great potential demand for these products, which are likely to be consumed at a rapidly increasing rate as the over-all economy develops.

A number of Latin American countries export and import large quantities of oils and fats, but the products imported by one group are seldom the same as those exported by the others, although they often have similar uses. The present pattern of trade largely reflects the influence of economic policy factors. Although quantitative and other customs duties and restrictions constitute relatively serious trade barriers, they have been powerless to prevent the rapid growth of imports of oils and fats, principally from other regions.

(a) *Vegetable oils*

Five raw materials and the corresponding edible vegetable oils together account for 90 per cent of vegetable oils production and nearly half the total supply of fats in Latin America. In order of importance they are cottonseed and cottonseed oil; peanuts and peanut oil; sunflower seed and oil; copra and coconut oil; sesame and sesame oil. The remaining 10 per cent consist of a vast number of oils and raw materials which present innumerable unsolved problems as regards technology or

the adaptation of procedures. On the other hand, the first five commodities do not present any serious problems except for local difficulties in copra and coconut oil production, the only issues being quality control and the perfecting of methods of extraction and refining.

A brief review of the situation of the vegetable oil industry in the four countries under consideration indicates the following problems and studies as being of particular interest:

(i) A survey, with a view to preparing a kind of inventory, of the oils contained in plants found in abundance in the different countries but not industrially exploited, whether native species or imported plants that have acclimatized well and flourish in ideal conditions. Although much has been accomplished in this respect, especially in Argentina and Brazil, even more remains to be done. Moreover, the authors of the studies in question have usually confined themselves to writing them, thereafter filing them away until such time as someone interested comes along. There has obviously been no link-up with practical work. It would be useful if this kind of investigation, once brought to a successful conclusion, were to be supplemented by an agro-economic study and an exploration of future trading possibilities.

(ii) An analysis of the influence exerted by ecological conditions in the different environments on the characteristics and properties of the oils produced on the basis of known raw material and procedures. In countries with a diversity of climates and soils such characteristics as fusion or freezing point, oxidation, iodine index, etc., are often found to vary in oils extracted from seed originating in different areas. Although there may be no very urgent need for studies of this kind in countries where production is mainly for the home market — especially if the latter is well protected — they are vital when the product is for export and is likely to be constantly and carefully analysed by buyers.

(iii) Study of the behaviour of various blends of oils that are most likely to find a market in the different countries. One aspect that might be examined in relation to this subject is the tendency of some of the components to precipitate or flocculate under the influence of such factors as length of storage or changes in temperature. Although flocculation is generally caused by poor refining, it is also to be observed in well-processed oils. This is detrimental to the prestige of the industry if the product is intended for home consumption and even more so if it is for export.

(iv) Control of methods of gathering and handling the raw materials and of oil-extraction and refining procedures, as well as of possible improvements in the methods.

This should ensure that edible oils are processed in properly hygienic conditions and that oils for industrial use will meet the respective specifications and standards of quality so as to make both types completely acceptable on the international market. Meanwhile the principle of making the best possible use of the oil in the raw material must not be lost sight of.

One of the most typical cases in this respect is probably the manufacture of coconut oil in Paraguay, where there are no less than eighteen plants for extracting the oil, but only two or three of them are up to date. Although the poor quality of the products is due not so much to the technical methods used as to other factors — transport problems, the work habits of the agricultural population,

financial questions and fiscal policy — it is essential to determine and clearly establish what is needful and expedient from the technical standpoint so that the advantages of pursuing those methods will become apparent.

In 1959 Paraguay processed 8 263 tons of coconut kernel (total for all *Acrocomia*), from which 4 333 tons of oil were extracted, and 10 413 tons of pulp, yielding 1 900 tons of pulp oil. Of the two, the kernel oil contains more than 80 per cent oleic acid and is highly edible. The pulp oil, on the other hand, contains only 20 per cent oleic acid as against 60 per cent lauric acid and is therefore excellent for soap-making. The depulping of the fresh coconut is very difficult. The traditional method is to heap up the coconuts in the fresh air or in sheds and leave them for four or five months so that the pulp can dry. Under this system pulp losses amount to 30 per cent or more and the oil obtained is too rancid to be accepted by international markets. The sensible thing to do would be to dry the coconuts in special ovens in the space of a few hours. In the present state of the facilities, the machinery separating the kernels from the pulp often breaks as much as 85 or 90 per cent. The broken kernels rapidly acidify and, furthermore, numerous pieces of kernel are lost during dehushing. If the coconuts were sorted into groups by size immediately upon removal from the ovens, and the depulping machines adjusted accordingly, this problem would be almost completely eliminated and the proportion of broken kernels might be reduced to less than 10 per cent.

(v) Studies on the hydrogenation of edible vegetable oils for the purpose of raising the fusion point and producing vegetable fats. Apart from the techniques themselves, trading customs and consumer preferences as regards both the flavour and the colour and consistency of the products must be considered by the researcher. For instance, the preparation of vegetable fats from cotton-seed oil has been studied in Argentina, and satisfactory conclusions have been reached.

In connexion with this question, it would be interesting to know why Colombia and Ecuador have placed an embargo on imports of peanut and sunflower seed oil, which are undoubtedly just as suitable as coconut oil for producing vegetable fats.

(vi) Studies on the oxidation of vegetable fats used in the manufacture of paints and varnishes.

(vii) Adaptation of the techniques of producing certain edible oils with well-defined characteristics to Latin American conditions. For example, if thorough processing were to be applied to maize, it would be possible to extract the oil contained in the germ. In the medical literature of the United States it has been asserted that corn oil, as one of the least saturated oils obtainable, is also the least likely of all fatty substances to cause arteriosclerosis. As a result, it is being consumed in much greater quantities there and in Latin America — even to the point of outstripping industrial possibilities, as in the case of Argentina.

Sorghum oil has recently begun to supplant corn oil in the United States. Sorghum can be grown successfully in many Latin American countries; hence, as its fecula compete with corn starch, and, when processed, it yields a resin as a by-product, thereby reducing over-all operating costs, it would be worth-while undertaking a very thorough study of the possibilities of processing the seed for all three purposes. The survey should of course

cover every aspect: technological, agronomic, industrial and economic.

(viii) A study of by-products from oil bearing plants, especially oil-cake and other oleaginous foodstuffs. Latin America exports large quantities of these, chiefly to Europe and the United States, where they are used as animal feed. In the last few years approximately 700 000 tons of oil-cake and oleaginous foodstuffs worth nearly 40 million dollars were exported. The bulk of this came from Argentina. Latin American demand for oleaginous by-products has increased with the development of its livestock industry, and several countries have had to step up their imports in recent years. Most of these have come from the United States and their total volume is not more than a fraction of the region's exports. There seem to be ample possibilities of increasing the use of by-products of oils and fats in Latin America, and any import requirements still remaining could easily be supplied from regional sources. Development of the potential inter-Latin American trade in these products would mean ensuring that the different kinds of oil-cake are treated with solvents to extract the oil, and then undertaking studies to ascertain the likelihood (i) of exporter countries adapting their production to traditional habits in the countries that are currently importers, and (ii) the likelihood of the importer countries adjusting their specifications and requirements to the kind of product obtainable from the exporter countries, thereby avoiding a repetition of the present situation in the vegetable oil trade.

(b) *Animal fats*

The principal exporters of edible and industrial animal fats are Argentina, southern Brazil and Uruguay, while the major importers are Central America, the Caribbean countries and Peru, which have been buying substantial quantities of pork fat (lard) abroad. Chile, Colombia and Mexico are the Latin American countries that import the largest quantities of animal fats for industry.

As animal fats are a by-product of the livestock industry, it is obviously no simple matter to step up their production in the countries where they are in short supply until a number of problems connected with that industry, and covering such aspects as herd increases, fodder, health and markets for meat and other products, have been solved. On the other hand, there should be no difficulty in undertaking programming and technological research to increase and improve the utilization of existing sources of raw materials.

It is in the nature of technological research that its findings often render the traditional products obsolete. A case in point is the discovery of synthetic monomeric detergents which, in a short space of time, have partially replaced soap and wiped out much of the consumer market for ordinary industrial animal fats. Once this happens a variety of surveys should be initiated immediately, some with a view to extending the range of applicability of the new product or process and others aimed at finding new uses for products ousted from their traditional markets.

There is no point in sitting back, for instance, and hoping that one day detergents will no longer be used because of the damage that the types now used are causing in Europe and the United States, where they are most popular; there they have been polluting underground

waters to an increasing extent as they infiltrate more and more into the soil, since the bacterial flora in the subsoil is incapable of decomposing them. Scientists and health experts have raised the alarm, but what will undoubtedly happen will not be a reversion to soap but the manufacture of detergents having a more complex molecular structure and consequently vulnerable to bacteria. Considerable progress has already been made in this respect. Any study of problems of industrial technology with a bearing on animal fats in Latin America should therefore take this gradual market displacement for granted as a fundamental and incontrovertible fact. The following observations are based on this assumption. The relative weakening of the market for industrial fats, owing to the replacement of soap by detergents, has obviously not had the same repercussions in the countries that used to be net exporters as in those that had a balanced market or were forced to import fats. The former are faced with restricted markets and lower prices for the fats they still manage to export, whereas the latter are in the fortunate position of obtaining their supplies more cheaply.

Nevertheless, if certain problems are dealt with in relation to present conditions, namely (i) the need to reduce the percentage of industrial animal fats within the total and (ii) the need to find more profitable applications and uses for these products, a new field is opened up for the countries that cease to be exporters; these might benefit greatly if they kept themselves informed of the progress made by the relevant investigations.

At the present time, the United States dominates the export market for industrial fats and tallows almost entirely. The decline that has already taken place in demand, added to the possibility that it may lose the remaining markets in the near future, has led to a number of investigations there on new ways of applying these products. For instance, the possibility of transforming saturated acids (palmitic and stearic) into dibasic acids that can be used for plastics and lubricants has been explored, apparently with good results.

While the practical prospects of establishing the relevant industries are being evaluated, a study has been made of the possibility of using industrial fats for poultry and cattle feed, also with good results. As regards the caloric balance of animal food, fats can replace two and a half times their weight in forage such as maize or barley, and offer a number of advantages. Theoretically, if little more than 2 per cent of fatty substances were included in the diet of all cattle in the United States, it would be enough to absorb the whole of the exportable surplus. Even so, it is unrealistic to think that this could be done in the near future. In the first place, information on new crop and stock farming practices takes a long time to reach farmers through the medium of extension services, and, secondly, the price of industrial fats would tend to rise as the exportable surplus was gradually absorbed in that way until the operation eventually became uneconomic.

In Argentina, which is the chief Latin American producer of animal fats, the following points have been investigated as a result of the relative deterioration of prices for industrial fats and tallows:

(i) Possibilities of increasing to the maximum percentage the proportion of edible fats, at the expense of industrial fats, within the over-all volume of animal fats produced. Under this head are included studies on the

size and distribution of slaughter-houses with a view to determining the minimum scale of operations that would allow of hygienic processing and reduce oxidation of the fats to a satisfactory level. A study has also been made of the processing of fats from animals slaughtered for reasons of illness, and automatically declared unfit for anything but industrial fats. Although a more up-to-date industrial process involves heating to 200°, a temperature at which germs cannot survive, several points still remain to be dealt with, such as the need for some guarantee that the fat has been treated at that heat and the need to put consumers on their guard with respect to products from the source in question;

(ii) Although nothing has yet been done in Argentina, the possibility of hydrogenizing animal fats still offers a suitable field for study;

(iii) On the other hand, inter-esterification is being considered — and research will probably be initiated shortly — with a view to fractioning molecules in longer series, obtaining shorter molecules with a lower fusion point and, in any case, increasing the plasticity of the products;

(iv) As most of the industry's products are for human consumption and it is hoped to produce even more for that purpose, attempts are being made to equip technical institutes to give advice to the industry on the handling and processing of raw materials;

(v) As regards fish oils and fats, no hydrogenation studies on how to deodorize them are being undertaken at the present time. The small quantity produced at present — entirely from fresh-water fish, mainly the shad — is used by the leather and soap industries. A tiny fraction is used for producing sulphonated oil, which is needed by the metallurgical and other industries;

(vi) Lastly, a method of using a by-product of edible fat processing has been studied and developed. It concerns the recovery of the protein content of the fatty tissues — “crackling” — for use as a source of protein in the human diet. The product thus obtained can be used, along with a certain admixture of meat, to fill all types of sausages and to make meat pastes.

(c) *Essential oils*

In addition to edible and industrial oils, there is ample scope for producing essential oils in Latin America. Most of them would be destined for export. They comprise essences of leaves, flowers, seeds, bark and wood, and are mainly used for making perfume, cosmetics, and liqueurs.

Numerous studies of native plants have been carried out in Brazil and have led to the organization of industries that generally supply the whole domestic market for the product concerned and export the surplus. This also occurs on a smaller scale in Argentina, Chile and Paraguay.

It is probable that nearly all the Latin American countries have enough raw material for this type of industry, in the form of native plants and trees or of imports that acclimatize well and are easy to grow. But as the products have a very limited market and require extensive study, it would be essential to undertake agro-economic studies to assess costs, quite apart from the technological research needed to ascertain the most suitable procedures. A market study is particularly necessary since, on the one hand, the market for oils of this kind is sensitive to changes

in fashion and customs and, on the other, total demand for each kind tends to be limited and rigid. Research in this field should therefore cover the following points:

- (i) An inventory of native and imported plants that could yield essential oils, with due regard for their yield and the best methods of processing. This should be followed immediately by an agro-economic study to determine the cost of the raw materials, delivered to the factory, and a detailed analysis of the relevant national and international markets;
- (ii) As industries of this kind already exist, programmes of technological research should include the provision of advisory services for improving the handling of raw material and extraction and refining processes.

(d) *Summary of the problems raised by technological research on oils and fats*

In view of the close relationship between some of the processes, studies and investigations referred to, a table has been prepared (table 1) listing them in the left-hand column and indicating by means of an "x" in the other columns whether they should be pursued with respect to vegetable oils, animal fats, essential oils or several at a time.

Table 1 shows that the problems outlined with respect to essential oils apply to vegetable oils in general. Although the steam process used in most cases to extract the essential oil is only very exceptionally employed in the production of oils for mass consumption, the other problems are so similar that both branches of the industry should be investigated in the same research centre.

To a certain extent, many of the problems affecting animal fats are the same as those facing the vegetable oil industry and, in some cases, the techniques applied are identical. On the other hand, some research programmes that have been listed call for special equipment and techniques, as for instances, the inter-esterification of fats. Hence, the decision as to whether one or two centres should be used in each case is mainly determined by such factors as the amount of work to be entrusted to the

Table 1
PROCESSES, STUDIES AND RESEARCH RELATING TO THE DIFFERENT OILS AND FATS MENTIONED IN THE TEXT

Problems	Vegetable oils	Animal fats	Essential oil
(a) Inventory of fatty raw material, agro-economic and market studies	x		x
(b) Investigation of variations caused by the ecological conditions in which the raw material was produced	x		
(c) Blends of oils			
(d) Increase in the proportion of edible fats		x	
(e) Control and improvement of the handling and processing of raw materials .	x	x	x
(f) Hydrogenation of oils and fats . . .	x	x	
(g) Inter-esterification of fats		x	
(h) Oxidation of vegetable oils for paints and varnishes	x		
(i) Special studies			
(i) Industrial processing of sorghum	x		
(ii) Fish oils and fats		x	
(j) Research on the improved utilization of by-products			

institute and the laboratory facilities and staff at its disposal.

Table 1 also gives the impression that, in contrast to the conclusions reached by the analysis of most of the foregoing sections, namely that pending problems could perfectly well be handled by a single central institute, some doubtful points with respect to fats and oils could be cleared up more efficiently if one institute were to be established in each country, or jointly by several countries, provided these were not very large and had a similar climate and flora. The *prima facie* problems would be those listed under (a), (b), (c), (e) and (j): an inventory of the possible sources of oil; an investigation of variations in characteristics deriving from climate and soil conditions; possible blends of oils; technical advice for industry; and better utilization of by-products. But some questions have also been mentioned that could be investigated in central research institutes, since they entail more complicated work and highly specialized equipment and personnel.

Lastly, if the problems set forth in table 1 are considered from the standpoint of the circles interested in their investigation, the conclusion to be drawn would include all industrialists and even Government economic planning and development organizations.

4. PROBLEMS RELATING TO BREAD AND FLOUR

At first sight it may seem strange that this study should include baking and flour manufacture among the Latin American industries that present technical problems worthy of consideration, since these are activities that have been pursued since time immemorial. The problems derive from the fact that many Latin American countries are in tropical and sub-tropical zones that are unsuitable for wheat cultivation, which means that it would be useful to find substitutes for wheat in flour manufacture. But the temperate-zone countries, which are called upon to solve the problem, are unable to do so because of their limited production, which will be even more inadequate in future owing to the rapid increase in wheat consumption.

The reverse occurs in the United States, where the progress made by agricultural techniques has carried wheat output to such heights that the Government buys a third of the yearly production and stores it as surplus food, thereby (i) preventing world market prices from falling as they would if the surplus were exported as well; and (ii) protecting farmers in the United States from a loss of purchasing power, as would be the case if wheat sales were left at the mercy of the free play of economic forces in the home market.

The change in eating habits observable over the last twenty-five years has been partly responsible for the situation in the United States. While the capacity for producing foodstuffs has more than doubled, the average diet has dropped by about 250 calories, i.e. nearly 10 per cent. The bulk of the loss is borne by cereals, which have been partially supplanted by more nutritious foodstuffs such as meat, dairy products and vegetables.

For this reason, numerous technological studies have been carried out in the United States in relation to wheat, wheaten flour and related products. Most of the studies aim at discovering new ways of processing the traditional products or manufacturing entirely new products for which

there is a potential demand, in order to raise wheat consumption. Some of the new products are for the luxury market, others for culinary use and others again form mixtures of vegetable proteins and fats or oils that would be better-balanced from the nutritional point of view and would substantially reduce the cost of a well-rounded diet. Naturally, research workers are also intent upon discovering a complete staple food that is easy to transport and could be sold or donated to countries where the population suffers from malnutrition, thus solving, for the time being at least, a serious social problem that is also a problem of human productivity.

The problem is entirely different in Latin America. Except for Argentina and Uruguay, which are traditional large-scale exporters of wheat, and Mexico, which is self-sufficient, the remaining countries are net wheat importers in varying degrees. The country averages for production and foreign trade in the three-year period 1958-60 are given in table 2. During that period, when total average production was 9.26 million tons, Argentina and Uruguay exported 2.4 million, while the remainder of the countries had to import 2.95 million; accordingly Latin America as a whole had a net import balance of about 500 000 tons.

The figure in question is relatively high for the region as a whole, since the value of the net imports was some 35 million dollars. But this is not the only problem. In contrast with the situation in the United States, consumption in Latin America is growing very rapidly in step with economic development. Flour products — bread and food pastes — are the staple items of diet of the rural population which, with the development of the economy, is settling in the towns. As time goes on, when this sector of the population has a higher average level of income there may be a repetition of the falling-off

observed in the United States. For the time being, however, statistics show a marked rise in consumption in nearly every country, and this is what must be regarded as the real trend.

One of the methods suggested for solving the problem is to add manioc fecula to wheat flour. Incidentally, if the climate and soil are suitable, manioc yields a larger volume of food per hectare than any other known plant, including rice and potatoes. Another solution would be to add degerminated corn flour to the wheat flour; this presents less technical difficulty than the admixture of manioc flour. The latter possibility has been considered in various countries and put into practice to a certain extent in some of them. This section is primarily concerned with determining what technological research is necessary or expedient for the satisfactory implementation of a programme.

Considering that of the countries included in table 2 only Chile and Uruguay¹⁰ lack facilities for growing yucca — Argentina appears to have no interest in the problem — the conclusion to be drawn is that, apart from Mexico, potential producers of yucca grow nearly 1 080 000 tons of wheat and import 2 817 000 tons, which gives them an apparent consumption of 3 897 000 tons. The exclusion of the figures for Mexico from those given above is due to the fact that the country is self-sufficient, producing annually around 1 260 000 tons of wheat. However, if the fact is taken into consideration that in order to achieve this the price of domestic wheat has to be maintained at a level nearly 50 per cent above that of wheat on the international market, the question arises whether a policy designed to reduce wheat consumption and replace part of it by yucca, to abandon the marginal cultivation of wheat and lower the price within the country, would not be warranted. Moreover, since the present level of prices appears to indicate that production of all the wheat placed on the market creates a problem, a study of the possibilities offered by yucca might facilitate a policy of absorption of the probable increase in consumption in future years through the use of manioc.

Experts do not always agree on the maximum percentage of manioc which can be mixed with wheaten flour. For example, the following figures are given as the percentages actually in use: Brazil, 12 per cent for bread-making; Peru, up to 20 per cent for bread-making, 20 to 25 per cent for biscuits and 15 per cent for pastes.¹¹ However, it seems difficult in practice to achieve very high percentages. In establishing these percentages, it should be borne in mind that wheat milling gives 73 per cent to 80 per cent of flour. Thus, if the figures relate to wheat, the 12 per cent of manioc given as the normal proportion in Brazil would correspond to a figure of 8.2 per cent to 9.6 per cent of the quantity of wheat, depending upon the flour extraction method used. As a rule of thumb, a figure of 10 per cent of the quantity of wheat will be considered here as an easily attainable target.

Going back to the approximate apparent consumption which can be estimated from table 2, it may be concluded

¹⁰ The apparent contradiction in the table with respect to Uruguay, which is shown as importing and exporting large quantities of wheat, is due to the fact that the figures related to averages for a three-year period. In 1960, because of weather conditions, Uruguay's normal crop of some 400 000 tons dropped to 183 000 tons, and this compelled the country to import a large amount of wheat. Normally, Uruguay exports around 150 000 tons.

¹¹ See R. P. Levey, "La yuca, pan de la selva", *La Hacienda*, New York, April 1952.

Table 2

LATIN AMERICA: AVERAGE WHEAT PRODUCTION AND FOREIGN TRADE, 1958-60^a

(Thousands of tons)

Country	Production	Exports	Imports
Argentina	5 506	2 332	—
Bolivia	11	—	24
Brazil	627	—	1 786
Chile	1 148	—	62
Colombia	145	—	90
Costa Rica	—	—	5
Cuba	—	—	110
Dominican Republic	—	—	8
Ecuador	55	—	41
El Salvador	—	—	5
Guatemala	22 ^b	—	41 ^b
Haiti	—	—	—
Honduras	1	—	8
Mexico	1 264 ^b	—	— ^b
Nicaragua	— ^b	—	— ^b
Panama	—	—	—
Paraguay	11	—	67
Peru	150	—	315
Venezuela	2	—	217
Uruguay ^c	319	108	75
Total	9 261	2 440	2 954

^a These data cannot be used for an exact calculation of apparent consumption, since the foreign trade figures correspond to calendar years and the production figures to the harvest periods.

^b No information available.

^c The figures for Uruguay are abnormal, since a bad harvest led to heavy imports in 1960.

that this 10 per cent represents some 400 000 tons annually for all the potential manioc producers, leaving aside Mexico, and some 500 000 tons if Mexico is included. This represents import substitution figures ranging from 28 million dollars to 35 million dollars annually for Latin America as a whole, but implying substantial amounts for countries considered individually.

Of the four countries which are more particularly the subject of this paper, Argentina and Chile are hardly likely to have any interest in the problem; of the remaining two, Brazil is clearly the more advanced in research. However, since the problem is closely bound up with food habits and tastes and, moreover, since the preparation of yucca is spread over a great number of small establishments, virtually of the home industry type,¹² the following analysis will deal specifically with Paraguay, which would seem to illustrate the difficulties very clearly.

Over fifty varieties of yucca are known to grow in Paraguay, and these may first be divided into two major groups: the sweet and the bitter varieties. The latter owes its flavour to its high content of phydrocyanic acid — up to 0.022 per cent — which makes it unsuitable for direct human consumption, in spite of its higher fecula content. It is chiefly grown for the production of starch.¹³ Since 1949 both the sweet and the bitter types have been affected by the disease called bacteriosis, against which no therapeutic or prophylactic treatment has yet been discovered. The Government of Paraguay is carrying out botanical tests with a view to discovering species immune to the disease among the many indigenous and certain imported varieties.

The average yield of yucca in Paraguay varies between 13-14 tons and as many as 35 or even 40 tons of roots per hectare, depending upon the weather conditions obtaining during the year and the quality of the soil. Some 60 000 hectares are normally cultivated for direct consumption and the manufacture of starch, and it is said that some land has been used for yucca cultivation for over fifty years without any rotation whatsoever. The shrubs have a life of several years and the roots are usually harvested between the ninth or tenth month and the thirty-sixth month. Production takes place over about six months in the year only. The branches and leaves, dried and chopped, provide good animal fodder, since they are as rich in proteins as alfalfa.

The roots must be processed as quickly as possible, since they decompose rapidly as a result of the action of enzymes and their high humidity content. The stages in the manufacture of flour are: (i) *washing* by high-pressure hoses and revolving drums; (ii) *chopping* into slices 5 to 10 millimetres in thickness; (iii) *pressing* of the slices in order to remove 30 per cent to 40 per cent of their humidity; (iv) *drying* in revolving drums equipped with steam pipes; initial maximum temperature should not exceed 49° centigrade and final temperature should not be more than 60°; the average humidity remaining in the product should be 7 per cent; (v) *milling* and *sifting*. The dry slices are ground in cylinder mills through sieves of 36-mesh per linear centimetre. The average flour yield is 60 per cent.

¹² Most of the data are taken from the paper by Dr. Julio Cesar Cristaldo, "La industria de la mandioca", *Bulletin* of the Ministry of Agriculture and Livestock, No. 160, Asunción, 1955.
¹³ In the starch-manufacturing process, the ground yucca is mixed with water, which dissolves the hydrocyanic acid. Both the starch and the granulous residue are fit for human consumption.

In 1942 a Decree was promulgated in Paraguay (No. 12, 245) which authorized the mixing of not more than 30 per cent corn or manioc flour with wheat flour. In spite of the fact that one mill produced up to 3 300 tons of corn flour, the experiment failed because: (i) the corn flour was manufactured from grain with the germ still in it, and the oil it contained passed into the flour and quickly turned it musty; (ii) the mixing was not done in the mill but by the bakers themselves, who very often exceeded the maximum limit allowed and turned out a product of poor quality; this, added to the mustiness of the flour, gave the mixture a bad name. In other cases, the little yucca flour used was made from boiled yucca, which introduced a completely inert element in the bread-making.

The addition of yucca flour was again considered recently and the following experiment was envisaged: (i) the yucca content of the mixture would be limited to 10 per cent; (ii) the wheaten flour extraction used in the mixtures would be raised from 73 per cent — which is the normal percentage in Paraguay — to 90 per cent, in order to increase its nutritional value. Table 3 provides some figures showing the nutritional value of wheaten flour alone and of the mixture.

The table makes it clear that the mixture is richer in nutritional elements than the flour of 73 per cent extraction commonly used in Paraguay. The authors of the scheme also maintain that flour of 80 per cent extraction is quite common in some wheat-importing countries such as Bolivia, Brazil, Chile and Peru.

The following proposals may be added to those mentioned earlier:

- (i) To produce the amount of yucca required for this operation some 850 hectares to 1 000 hectares would have to be added to the 60 000 hectares on which yucca is already grown. This should not present any problem;
- (ii) To concentrate the dried yucca in two plants of industrial size with a daily capacity of 200 tons. These should be located in existing yucca production centres, each of them about 100 kilometres from the mill, which would be at Asunción. This would guarantee the uniformity of the product sent for milling;
- (iii) To establish at Asunción a yucca flour mill with

Table 3
COMPARISON OF THE NUTRITIONAL VALUE OF WHEATEN FLOUR UNADULTERATED AND IN A MIXTURE CONTAINING 10 PER CENT OF YUCCA FLOUR

Component	100 grammes of wheaten flour of 73 per cent extraction	100 grammes of mixture: 90 per cent wheaten flour 80 per cent extraction and 10 per cent yucca flour
Humidity (percentage) . .	12	12.2
Calories	364	348.8
Proteins (percentage) . . .	10.9	10.65
Fats (percentage)	1.1	1.41
Calcium (milligrammes) . .	16	22.8
Iron (milligrammes)	1	2.2
Vitamin B-1 (milligrammes)	0.13	0.28
Vitamin B-2 (milligrammes)	0.04	0.06
Vitamin B-3 (milligrammes)	1.1	1.5
Ascorbic acid (milligrammes)	0	0

a capacity of 25 tons every twenty-four hours and an annual work period of 300 days. It should be located in the capital since it would mill 90 per cent of the wheat;

(iv) To deliver the yucca flour to the wheat mills to be mixed there with wheat of 80 per cent extraction. The percentage of yucca included would be increased, as adequate production became available, up to a maximum of 10 per cent of the mixture;

(v) To set up a technological research centre to study the raw material, improve the industrial process and ensure the quality and uniformity of the product.

With a view to providing the population with a better food product making good use of the country's resources, there has been talk of producing a "Paraguayan national flour", consumption of which would be compulsory. The suggested composition of this flour is as follows:

	Percentage
Wheat flour	50
Manioc flour	25
Wheat flour with the germ removed	15
Soya bean flour	10

Unfortunately no information is available as to any experiments which may have been carried out on the basis of the above formula.

In the light of what has been said, it would be easy to list the various kinds of research which are suggested by the Paraguayan experiment, with a view to the use of manioc flour as an addition to wheaten flour. Various other plants might also be mentioned which would be capable of producing economically a certain amount of flour for the purpose. However, the situation should also be viewed from the standpoint of wheat itself, since it is the basic element in these mixtures, and this points to the studies being carried out by the wheat-exporting countries. Similar studies should also be undertaken in countries

which produce only part of the wheat they consume and must import the rest.

In Argentina, the wheat sold for sowing must be registered with the Grain and Forage Production Authority of the Office of the Secretary of State for Agriculture and Livestock, which controls reproduction of this type of seed. The country has been divided into major wheat zones according to the ecological conditions obtaining in each of them, and the Authority recommends specific varieties of wheat for each particular zone. Its Applied Technology Division collects each year samples of the wheat subject to control and publishes tables giving an analysis and showing the mean characteristics of the samples. Table 4 shows some of the data on the 1959-60 crop in the Marcos Juárez-Oliveros-Pergamino-R. J. Cárcano zone situated at the junction of the Provinces of Buenos Aires, Santa Fe and Córdoba, some 400 kilometres north of the capital.

If the capacity of wheaten flour to absorb other flour — such as yucca — lacking in bread-making properties depends on the volume of bread produced per 100 grammes of wheaten flour under the conditions mentioned earlier, we find that, among the various wheats recommended for the Argentine Sub-Region II North, this capacity varies between 650 and 900 cubic centimetres, i.e. nearly 40 per cent.

It should nevertheless be borne in mind that the above indices are not completely steady and may vary from year to year for the same variety of wheat as a result of weather conditions. Some of these variations are shown in table 5, in which, for the sake of simplicity, four types of wheat have been selected, two of greater and two of lesser bread-making capacity, representing the agricultural year 1959-60. The variations observed, particularly in the "Buck Atlántico" variety of wheat, show that observations should be made constantly and not just once for each type of wheat or climatic zone.

Table 4

ARGENTINA: SOME CHARACTERISTICS OF THE WHEAT RECOMMENDED FOR SUB-REGION II NORTH FOR THE AGRICULTURAL YEAR 1959-60

Variety	Hectolitre weight of clean wheat	Clean wheat flour yield	Gluten in wheat	Water absorbed in bread- making (percentage of its weight)	Volume in cubic centi- metres of bread per 100 grammes of wheat
Klein Petiso	80.80	71.46	38.2	68.6	770
Klein Rendidor	79.25	67.84	37.2	65.9	900
Sureño M.A.	79.45	74.34	37.0	65.8	750
El Gaucho F.A.	78.60	69.21	41.0	63.2	750
Gral. Roca M.A.G.	82.60	73.11	37.1	67.8	900
Buck Atlántico	79.90	71.13	35.8	62.7	650
Olaeta Rumbo	79.25	73.19	44.0	64.6	900
Klein Credito	82.92	69.75	34.5	65.0	900
Klein Colon	81.70	70.85	35.5	65.0	790
Buck Maipu	79.00	72.68	34.0	66.0	780
Rafaela M.A.G.	80.60	65.28	32.5	62.0	700
Guatracho Hucal M.A.G. . .	79.00	71.24	35.0	63.6	700
Buck Pumpero	78.15	68.04	35.0	68.9	760
El Entrerriano M.A.G. . . .	78.60	65.26	36.8	63.6	820
Olaeta Artillero	80.35	75.72	36.5	62.5	650
Olaeta Cordial	79.45	70.10	45.5	63.3	650
Pergamino Caboto M.A.G. .	80.35	67.52	35.0	62.0	750
Tez. Pinto Criollo M.A.G. .	79.45	68.11	38.1	63.3	720

Table 5

ARGENTINA: VARIATIONS IN THE BREAD-MAKING
INDEX OF SOME VARIETIES OF WHEAT IN VA-
RIOUS CROPS OF SUB-REGION NORTH II

(Cubic centimetres of bread
per 100 grammes of flour)

Variety	Crop 1957-58	Crop 1959-60	Crop 1961-62
Klein Rendidor	^a	900	900
Gral. Roca M.A.G.	900	900	900
Buck Atlántico	900	650	900
Olaeta Artillero	670	650	640

^a This variety does not seem to be included among those recommended for the Sub-Region in the agricultural year 1957-58.

The individual characteristics of the different varieties of wheat are, of course, lost in the marketing of wheat crops since all the grain from the same variety of wheat is mixed in the grain elevators. Hence, only general reports can be obtained by importing countries interested in getting a type of wheat with high bread-making properties. On the other hand, countries which produce part of the wheat they consume and import the rest should, it would seem, pay careful attention to the behaviour of the different types of wheat produced on their land.

Apart from the differences in the characteristics of bread-making due to the composition of the wheat itself, consideration should be given to the possibility of improving it with the aid of chemical substances called "improvers". This process enables a wide range of variations to be obtained and is applied in several countries, where it is often the subject of a host of regulations on the part of the agriculture and health authorities. There is an abundance of technical literature on the subject; this is mentioned merely to indicate that the problem is one of many which should be considered in conjunction with technological research on bread-making.

To sum up, the following points are worth examining in connexion with bread and flour problems in countries which import much of the wheat they consume:

(i) Varieties of wheat capable of being produced in the country; their bread-making properties and measures

calculated to improve the average quality of the wheat grown;

(ii) Types of plant capable of producing flour; varieties of such plants; the extent to which they are affected by ecological conditions, and an agro-economic study of farming and flour yield;

(iii) Characteristics of the wheat which is, or could be, imported into the country;

(iv) Characteristics of bread made from mixtures of wheaten flour and flour from other plants — which might be grown on a wider scale in the country — and the nutritional properties of such flours;

(v) Industrial processes required to produce flour from other plants and design of the establishments needed;

(vi) Possible effect of "improvers" on these mixtures;

(vii) Economic study of the operation as a whole, from the standpoint both of the country itself and of the different groups of producers who will be involved in the process;

(viii) Planning of the policy to be adopted for the supply of flour and bread and fixing of targets for the gradual adoption of such a policy;

(ix) Establishment of laboratories and permanent control machinery.

It will readily be appreciated, from the above points, that no group of private entrepreneurs can — or would wish to — defray in full the enormous cost of the research required. Accordingly the research must be financed, at least in part, by the government agencies responsible for the planning or direction of economic activities. Moreover, some of the research is purely agricultural while part of it consists of technological-industrial research. A further complication arises from the fact that the public health authorities must inevitably come into the picture in view of their concern for the possible effect of whatever solution is arrived at both on the health of the population and on nutrition.

Lastly, it may also be concluded from the above list of points that much of the research work should be done within the countries themselves and a rational decentralization of the studies and the establishment of an expeditious and efficient system of exchange of information would therefore be desirable. The only research requiring complete centralization would appear to be work on the effect of improvers, their application and the desirability or suitability of their use.

III. OVER-ALL PICTURE OF THE TECHNICAL PROBLEMS RAISED

This section consists of an over-all study of the research subjects outlined earlier and a few suggestions are made on the type of centres or institutes which could undertake the work and their possible geographical distribution in order to make the best possible use of the little professional skill and scientific equipment available at present in Latin America. However, as this paper had to be written in a short space of time, it was not possible to go very deeply into the type of research required to solve each problem, let alone to evaluate the resources available in the institutes now operating in the four countries considered. The suggestions made below must therefore be considered as preliminary ideas, and it is hoped that experts on the subject will submit their comments and observations.

A total of forty-three subjects of technological research

essential to ensure economic development of the six branches dealt with in this paper have been listed. Some of the research is very simple and much of it could be done by any good analysis laboratory. On the other hand, some of it is very complicated and would require special equipment — in many instances designed specifically for such research — and also call for considerable capacity and experience on the part of the research workers.

Midway between these two types is a third set of problems. Special equipment is required, but it can also be used to solve a number of similar problems. In addition, specialized scientific and technical staff is required, with a good knowledge of the subject concerned. The relative difficulty of the different subjects is used as one of the criteria for classifying the problems into the three follow-

ing groups (i) the more simple problems not requiring highly expert staff or costly equipment; (ii) those which require staff with a wider range of knowledge and experience and valuable equipment, provided that the latter is not of a type which can only be used for a study of the specific problem; (iii) extremely complicated problems calling for a group of experts familiar with the specific problem, accustomed to doing research work as a team, and requiring for their work valuable equipment of little use for other purposes.

A second criterion for classifying problems might be based on samples of the substances to be studied and the need for frequent contact between the institute and the source of the raw material. In connexion with this ap-

proach, the following might be considered: (i) the research which needs frequent and immediate contact with the source of the raw material or the area in which the problem arises; (ii) the more complicated technological problems in which the samples are relatively few and far between; here no great problem would arise if the samples have to be sent abroad; (iii) research — particularly in a pilot plant — on problems for which a single large sample would suffice and where, once this is ready, contact with the point of origin is not required until the research work is completed.

On the basis of the classification criteria mentioned above, table 6 has been prepared. It summarizes the research problems analysed earlier, and the groups of

Table 6

CLASSIFICATION OF THE TECHNOLOGICAL RESEARCH PROBLEMS LISTED ABOVE BY TYPE OF LABORATORY EQUIPPED TO STUDY THEM

Problems with respect to which research is warranted	Simple ^a	Intermediate ^b	Complicated ^c	Problems with respect to which research is warranted	Simple ^a	Intermediate ^b	Complicated ^c
<i>A. Problems relating to the coking of coals</i>				D.h Extraction of sulphur from lake sediment by use of solvents . . .			
A.a Purification by phase separation .		x		x		x	
A.b Manufacture of pre-formed coke briquettes		x		<i>E. Problems relating to oils</i>			
A.c Low-temperature distillation and coking of mixtures with semi-coke		x		E.a Inventory of plants producing vegetable oils	x		
A.d Coking of mixtures with tar, asphalt and other agglutinatives . .	x			E.b Effect of ecological conditions on the characteristics of vegetable oils	x		
A.e Coking of various coal mixtures .	x			E.c Behaviour of oil mixtures	x		
A.f Reactibility of pre-formed coke briquettes			x	E.d Control of extraction and handling processes	x	x	
A.g Petrographic studies of coal and its effect on coking		x		E.e Hydrogenation of vegetable oils . .	x	x	
				E.f Oxidation of industrial oils	x	x	
<i>B. Iron ore reduction</i>				E.g Full processing of certain types of seeds	x	x	
B.a Examination of deposits and comparative analysis of samples . . .	x			E.h Processing of oil by-products . . .	x	x	
B.b Study of the characteristics of iron ore and determination of the reduction processes to be recommended		x		<i>F. Problems relating to animal fats</i>			
B.c Study to be carried out in a pilot plant using the most satisfactory process developed under B.b . . .			x	F.a Possibility of increasing the percentage of edible fats in total extraction	x	x	
<i>C. Concentration of manganese</i>				F.b Hydrogenation of animal fats . . .	x	x	
C.a Current studies of ore concentration	x			F.c Inter-esterification of animal fats .		x	
C.b Ore roasting, reduction to MnO ₂ and concentration of the roasted product	x	x		F.d Control of animal fat extraction processes	x		
C.c Production of electrolytic manganese		x		F.e Research into fish fats	x		
<i>D. Production of sulphur and sulphuric acid</i>				F.f Processing of fatty by-products . .	x	x	
D.a Concentration of volcanic sulphur ore	x	x		<i>G. Problems relating to essential oils</i>			
D.b Refining of sulphur concentrates .		x		G.a Inventory of potential production .	x		
D.c Stabilization of pyritic coal . . .		x		G.b Advising the essential oils industry	x	x	
D.d Extraction of solid sulphur from pyrites		x		<i>H. Problems relating to flour and bread-making</i>			
D.e Extraction of sulphuric acid from combustion gases	x			H.a National research into the characteristics of domestic wheat	x		
D.f Extraction of solid sulphur from combustion gases		x	x	H.b Research into plants capable of producing substitutes for wheaten flour	x		
D.g Flotation of sulphur from lake sediment	x	x		H.c Research into the characteristics of wheat to be imported	x		
				H.d Processes for producing flour substitutes	x		
				H.e Bread-making characteristics of possible mixtures	x		
				H.f Study of the effect of chemical improvers on mixtures of wheaten flour and substitutes	x	x	

^a Research regarded as simple, for which there should if possible be at least one research institute in the country in which the problem arises.

^b Research requiring competent staff and relatively specialized equipment. The possibility of concentrating such research among

a few institutes in Latin America should be considered.

^c Research of a type more or less exclusively confined to a few institutes throughout the world. Research of this type is not warranted in Latin America.

institutes suggested are divided into three columns so as to classify the various subjects concerned. Of the total of 43 research subjects entered in the left column, 30 are simple, so that it would be justifiable to set up research institutes in each of the countries where the problem arises. The classification also includes all the subjects for which a large measure of contact between the institute and the source of the problem is essential. The second group includes 25 problems classified as being of intermediate complexity; here constant exchange of information between the institute and the source is not as essential. In order to make better use of existing resources in Latin America, it might be advisable to divide up the work among a few centres located in places and countries where

the facilities for solving the particular problems are greatest. Lastly, the third group — the most difficult — comprises three problems with respect to which research might perhaps be entrusted to institutes abroad, some of the material being prepared in Latin America.

As will be seen, the total number of problems involving research work (43) does not tally with the sum of the partial problems (58) which it is suggested should be entrusted to the various institutes. The reason is that the best way of dealing with certain problems might be to distribute part of the work among institutes of different kinds or to have the work of less qualified laboratories duplicated by laboratories of higher standing in order to ensure proper control.

ECLA'S RECENT ACTIVITIES

I

WORKSHOP ON BUDGETARY CLASSIFICATION AND MANAGEMENT

This Workshop was held at Santiago, from 3 to 14 September 1962, under the auspices of ECLA, the Bureau of Technical Assistance Operations (BTAO), the Division of Public Administration and the Fiscal and Financial Branch of the Department of Economic and Social Affairs of the United Nations. It was the seventh of a series of Workshops organized by United Nations Headquarters in co-operation with the secretariats of the regional economic commissions, and the third for the Latin American countries. The first of the whole series was held at Mexico City in 1953 with the participation of the Governments of Central America, the Antilles, Mexico and the United States of America. Another meeting was held in May 1959 at Santiago, Chile — the second for Latin America and the first for the countries of South America. In 1955, 1957 and 1960 similar meetings were held at Bangkok for the countries of Asia and the Far East. In 1961 the first Workshop for the African countries was held at Addis Ababa.

The present meeting was attended by twenty-six experts nominated by twelve States members of the Economic Commission for Latin America, including for the first time participants from British Guiana and Surinam.

The fundamental purpose of the Workshop was to analyse the changes in ideas and procedures that are needed in the budget systems of the South American countries if better co-ordination is to be established between the processes of formulating and executing budgets and the planning processes, and to study the progress made in the field of budgetary management since the 1959 Workshop.

To guide its discussions, the Workshop adopted the following agenda:

1. Review of recent developments in the field of budget management

- (a) The development of policy accounts providing classifications of government transactions according to economic and functional categories

- (b) The problems relating to the adoption of budgets along programme and performance lines

2. Relationship between the annual budget and the long and medium-term plan

3. Performance approach to government budgeting

4. Performance budget classifications

5. Performance budgeting and accounting

6. Measurement of work

7. Installation of a performance budget system

Among the documents discussed by the participants were *A manual for programme and performance budgeting* (E/CN.12/BRW.2/L.4) prepared by the Fiscal and Financial Branch; *Algunas consideraciones sobre las relaciones entre la programación del desarrollo y el presupuesto fiscal* (E/CN.12/BRW.2/L.5); *Estructura de un programa presupuestario* (E/CN.12/BRW.2/L.6) and *La experiencia de algunos países de América del Sur en materia de*

reforma presupuestaria (E/CN.12/BRW.2/L.10), prepared by the ECLA secretariat.

The meeting opened under the chairmanship of Mr. Alfonso Santa Cruz, Acting Executive Secretary of ECLA, who delivered the opening address. Mr. Sergio Molina Silva, Director of the Budget for Chile, then took the floor and welcomed the participants on behalf of the Chilean Government.

With respect to item 1 of the agenda, the Workshop noted that the usefulness of economic and functional classifications of government transactions has been generally recognized and most of the countries of South America have adopted them. In this work the United Nations *Manual for Economic and Functional Classification of Government Transactions* has proved a valuable guide.

The Workshop noted with great satisfaction that programme and performance budgeting had been established in several South American countries as a means of facilitating programming in the public sector, helping the latter to act more efficiently and, above all, making the application of economic and social development plans more coherent. The participants considered that the reforms put through in the last three years had led to far more radical changes than those of earlier years.

It was pointed out during the discussions that the South American countries had not all made the same degree of progress in budget programming. Some Governments have already institutionalized programme budgeting systems. Colombia, for instance, on the basis of legislation has prepared four programme and performance budgets (1960, 1961, 1962 and 1963), co-ordinating them with the Four-Year Public Investment Plan for 1961-64 and with the Economic and Social Development Plan for 1961-70. Bolivia, following a constitutional directive, drew up two programme and performance budgets for 1961 and 1962, co-ordinating the second with the Economic and Social Development Plan for 1962-71. Ecuador classified its budget estimates for 1963 by programmes and activities in order to further the execution of its "Crash Plan" for Development. Other countries are making programme budgets as annexes to the traditional type of budget until the system of programme budgeting has been duly established by law. One of these is Venezuela, with its annex to the 1962 budget and its proposals for 1963, co-ordinated in both cases with the Four-Year Development Plan. British Guiana has also prepared an economic development plan for 1960-64 in connexion with the annual investment budget. Other countries are taking preliminary steps to introduce methods of budget programming; among them are Peru, which is drawing up a programme and performance budget for 1963, and Paraguay, where the Government has drafted a new organic law to institute the system of programme and performance budgeting, to be adopted for the 1963 budget. Lastly, Uruguay is taking the first steps to establish the system and exploring the

possibility of introducing it in certain services, while Chile has carried out some partial tests with a view to applying the system to education and public health. In Brazil the State of São Paulo has made an interesting experiment in this respect.

The Workshop pointed out that the way in which the system was established varied from one country to another. In some it has been introduced into all Ministries simultaneously. This has been done in Bolivia and Venezuela, and Paraguay and Peru are planning to follow suit. All these countries are endeavouring to have the system applied in independent institutions and by State and local governments. Some republics, however, have preferred to carry out tests in particular central government services, followed by further tests in the remaining ministries and government agencies. Chile, which made tests in its National Health Service and Ministry of Education, is a case in point.

The Workshop took note of the different methods of presentation used by the countries for their programme budgets. Colombia's budget for 1963 includes programmes giving a description of their objectives and summaries of allocations by sub-programmes and activities, of personnel classified by occupation and of expenditure by object. A detailed description of each sub-programme and activity is appended indicating objectives, personnel, budget allotments and, in some cases, an assessment of unit cost. Ecuador presents its programmes in synopsis, showing the principal functions to be carried out, the sub-programmes and activities comprised therein, the personnel required and the appropriations made. In the itemized parts the activities and projects are described and their cost estimated. Bolivia sets out its programmes in the 1962 budget, indicating their objectives, the personnel allotted to each one classified by income level and occupation, the appropriations and the origin of the funds. In the case of Venezuela, the annex to the 1963 budget shows, first, the targets and costs of the programme, the allocations classified by object and allocations by sub-programmes, and then describes each sub-programme, indicating its objectives, cost, the volume of meaningful activities to be undertaken and the staff required.

In many of the countries mentioned the attempts at reform have been facilitated by the assistance of the Advisory Groups sent by the United Nations to collaborate with Governments in the establishment of planning systems.

During the debate the Workshop laid stress on the considerable progress made in Latin America in budget classification and programming. It also expressly mentioned the desirability of using standard terminology and pointed to the existence of a number of problems and difficulties particularly with respect to the close link between the two processes of general and budget planning and to better co-ordination of budget accounting with the process of preparation and execution.

With respect to the relationship between over-all and budget planning, the Workshop reached the following conclusions:

(a) In view of the danger that the zealous efforts made in the field of planning and planning organization may be nullified by deficiencies in execution, and that the vital sense of purpose inspiring those efforts to bring about the economic and social development of the region may be weakened thereby, it is essential to establish satisfactory and integrated planning systems for the long, medium and short term.

(b) Medium-term budget plans and annual economic budgets, being the most suitable tools for achieving the integration of planning systems, should be drawn up as a frame of reference in co-ordination with long and medium-term economic plans and with the fiscal budgets of the different sectors of public activity. The integration of long-term development plans with medium and short-term measures could be achieved through the preparation of a plan for the public sector — specifying the Government's activities over the medium term — and of an annual economic budget itemizing the transactions for the forthcoming year and paving the way for the reconciliation of the annual fiscal budget with development plans and of the public with the private sector, questions which were dealt with in the document that served as a working paper for the discussion of this topic.

(c) In order to carry out more efficiently the task of programming — and budget programming in particular — it is indispensable to establish satisfactory and permanent information systems capable of supplying the necessary data, as well as sectoral agencies to formulate projects in a way that would be both continuous and compatible with the programming of the sector's activities in order to facilitate the analysis of different projects in each of the public sector's spheres of action when planning agencies have to fix priorities.

(d) To enable budget programming to operate in an integrated planning system of the kind deemed expedient, the techniques of programme budgeting should cover the whole of the public sector, and especially public enterprises. Similarly, budget programming should establish its own system of internal co-ordination among the different levels and sectors of public activity and, above all, lay particular stress on the harmonization of budget programmes for the different States or regions and their co-ordination with the regional plans or programmes already in existence. The Workshop considered that the subject of regional budget programming should be put on the agenda for future meetings.

(e) Since each budget programme is only one aspect of the annual plan of operations of the public sector, its connexion with the plan should be explicitly stated in its presentation and in the part that deals with budgeting for targets and/or aims.

(f) In order to attain the targets envisaged, the problems raised by the execution of budget plans entail the active participation of every sector of the population. They must share in the formulation of the plans and be informed when necessary of the *raison d'être* of each of the specific stages of the plan's application. In this respect, attention was drawn to the value of classification by functions and by programmes to illustrate in real terms the primary objectives and concrete targets for the public sector.

(g) To round off the conclusions, the participants considered that it would be very useful if the United Nations were to create a working group composed of experts on planning, budgets, planning administration, systems of economic information and accounting and control systems, to investigate practical problems connected with the implementation of planning and budget systems, and in particular, specific methods of co-ordinating plans, budgets and administrative organization, the findings to be presented at a seminar that might be organized by the United Nations itself.

The Workshop fully discussed the problems connected

with reforming the accounting system and reached the following conclusions and recommendations:

(a) All public sector accounting systems should be adapted to the programme data needs of performance budgeting, and accounting systems should be revised so as to provide the information and control data required for economic development planning, budget programming, and control over execution.

(b) Integrated financial management systems should be established that employ consistent classifications to unify the programming, budgeting, accounting and reporting operations and produce financial data serving economic and development needs as well as financial control requirements.

(c) Improved accounting systems should be developed in close co-operation with comptrollers' offices to establish, with due regard for audit requirements, a financial planning process that provides a time-table for the use of funds, estimates of the costs of programmes or activities and a picture of the planned physical accomplishments; there should be fund control practices to safeguard against over-expenditure of public funds, programme control practices that aim at the accomplishment

of physical objectives within estimated costs, and a system of reporting that will relate actual results to the financial plan in terms of fund control and the attainment of programme objectives.

(d) The reform of the integrated budget and accounting systems should take place in successive stages so that the operating agencies can adapt their administrative systems (organizational structure and operating procedures) to the requirements of planning, programming and control.

(e) Specific methods should be studied and developed for accounting and control in respect of programmes and activities in different situations, so as to facilitate execution and provide the data required for economic, planning and control purposes.

(f) Models of programme execution should be formulated, to make in clear how activities can be carried out in accordance with a financial programme that includes planned time-tables, and within estimated fund and cost limits.

(g) Methods should be studied and developed to enable the financial effects and physical achievements of the operations of autonomous agencies and enterprises to be brought within the budget planning, review and control processes as rapidly as possible.

II

CONFERENCE ON FISCAL POLICY

1. FOREWORD

A Conference on Fiscal Policy was held at Santiago, Chile, at the ECLA headquarters, from 5 to 14 December, under the auspices of the Joint Tax Program of the Organization of American States (OAS), the Inter-American Development Bank (IDB) and the Economic Commission for Latin America (ECLA).

A brief reminder of the various circumstances which led to the establishment of the Program and the convening of the Conference may be appropriate. They can be summed up as follows: (a) Since tax systems can be one of the most important instruments for the financing of Latin America's economic development, OAS IDB and ECLA decided, on the basis of the recommendations incorporated in the Act of Bogotá, to launch a long-term joint programme with a view to promoting the reform of tax systems and bringing about an improvement in tax administration. (b) The programme planned its activities round two meetings of experts. One of these was to devote its attention to the specific study of the problems of tax administration, and the other to the analysis of the principles of fiscal policy which should be borne in mind in view of the underlying purpose to be served: the achievement of intensive economic and social development combined with stability. Special studies on the tax systems of selected Latin American countries would be carried out simultaneously. (c) At the ninth session of ECLA (Santiago, Chile, 4 to 16 May 1961) and at the Special Meeting of the Inter-American Economic and Social Council (IA-ECOSOC) at the Ministerial Level (Punta del Este, Uruguay 5 to 17 August 1961), resolutions 186 (IX) "Fiscal Policy", and A.3 "Taxation Program" respectively, were adopted recommending to the Member Governments of both organizations that they should give their fullest support to the OAS-IDB-ECLA Program. (d) From 11 to 19 October 1961, a Conference on Tax Administration was held at Buenos Aires, Argentina, with

the participation of fifty-two experts from various countries throughout the American continent, fourteen observers from different countries and 115 Argentine experts designated to attend the meeting by official institutions and universities of the country. The pertinent report was submitted to the ninth session of the Committee of the Whole of ECLA (Santiago, Chile, February 1962) and to the first session of IA-ECOSOC at the Expert Level and at the Ministerial Level (Mexico City, October 1962).¹ (e) After the meeting at Buenos Aires preparations were begun — in conjunction with the study of the tax systems of selected countries — for the present Conference; recognized authorities on fiscal policy were invited to contribute panel papers, and distinguished Latin American experts were asked to prepare analyses and comments on them. (f) By bringing together outstanding international specialists and high-ranking Latin American officials, the Conference afforded an opportunity for discussion between those who approach fiscal problems from a purely theoretical standpoint and those who are engaged in solving them at the practical level. This made it possible for the topics of the agenda to be more comprehensively and thoroughly analysed, within the technical and practical framework which it was thought desirable to give to the Conference so that its findings might be useful to those called upon to take decisions relating to fiscal policy and tax reform.

The Conference was inaugurated on 5 December 1962 in the Library of ECLA. Addresses were delivered by Mr. Luis Mackenna, Minister of Finance of Chile, by Mr. Alfonso Santa Cruz, Acting Executive Secretary of ECLA and by Mr. Alvaro Magaña economist of the Pan American Union, who spoke on behalf of the Joint Tax Program OAS-IDB-ECLA.

Messages to the Conference from Mr. Jorge Sol Castellanos, Under-Secretary for Economic and Social Affairs

¹ See E/CN.12/AC.50/6 and OAS Ser.H.X.3 (background document No. 2), respectively.

of the Organization of American States and Executive Secretary of the IA-ECOSOC, Mr. Felipe Herrera, President of the Inter-American Development Bank (IDB), and Mr. Raúl Prebisch, Under-Secretary of the United Nations in charge of ECLA, were read out in the course of the opening meeting.

At their final meeting the participants in the Conference took cognizance of the provisional report of their proceedings, and empowered the secretariat of the Program to recast it in its final form.

The participants attending the Conference comprised forty-four experts on fiscal policy, from the following countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Italy, Mexico, Panama, Paraguay, Peru, Spain, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay and Venezuela. In addition, twenty-five experts from some of the above-mentioned countries and Nicaragua were present as observers.

Guests of honour at the Conference were Mr. José Rafael Abinader, Under-Secretary for Finance of the Dominican Republic, Mr. Edison Gnazzo, Director of the Income Tax Office of Uruguay, and Raúl Sáez, Acting Coordinator of the Committee of Nine appointed by the IA-ECOSOC.

The participants, the observers and the persons specially invited attended the Conference in a personal capacity and not as representatives of their countries or Governments.

The directors of the Joint Tax Program OAS-IDB-ECLA took the Chair at the Conference and conducted the proceedings in rotation. In the case of each of the topics considered, the authors of the panel papers and of the commentaries on them were invited to lead the discussion by making an opening statement and suggesting lines of approach. The business of the Conference was conducted in accordance with the following agenda:

1. Opening addresses
2. Fiscal policy in Latin America's economic development
Background documents
Panel paper by Víctor L. Urquidí (CPF-DB-8)
Comments by Felipe Pazos (CPF-DB-8/Add.1) and Aníbal Pinto (CPF-DB-8/Add.2)
3. Fiscal capacity of developing economies: issues of tax policy
Background documents
Panel paper by Rajanikant Desai, of the Fiscal and Financial Branch, Department of Economic and Social Affairs of the United Nations (CPF-DB-1)
4. The role of taxation in economic development
Background documents
Panel paper by Nicholas Kaldor (CPF-DB-3)
Comments by Federico Herschel (CPF-DB-3/Add.2) Rodrigo Núñez (CPF-DB-3/Add.1)
5. Issues of tax reform for Latin America
Background documents
Panel paper by Arnold C. Harberger (CPF-DB-4)
Comments by Carlos Matus (CPF-DB-4/Add.1)

6. Public expenditures and economic development

Background documents

Monograph sent in by John H. Adler (CPF-DB-10)
Comments by Jorge Méndez (CPF-DB-10/Add.1)

7. Personal income tax in Latin America

Background documents

Panel paper by Richard Goode (CPF-DB-2)
Comments by Ifigenia M. de Navarrete (CPF-DB-2/Add.1) and Ulises Flores and Alfonso Moisés Beatriz (CPF-DB-2/Add.2)

8. Taxes on net wealth, inheritances and gifts

Background documents

Panel paper by Dino Jarach (CPF-DB-5)
Comments by Carlos Casas (CPF-DB-5/Add.2) and Jaime Porras (CPF-DB-5/Add.1)

9. Corporate income taxation in Latin America

Background documents

Panel paper by Alan R. Prest (CPF-DB-1)
Comments by Braulio Jatar-Dotti (CPF-DB-1/Add.2) and Alexander Kafka (CPF-DB-1/Add.1)

10. Production, consumption and economic development taxes

Background documents

Panel paper by José María Naharro (CPF-DB-6)
Comments by Néstor Vega Moreno (CPF-DB-6/Add.1)

11. Reform of agricultural taxation to promote economic development in Latin America

Background documents

Monograph sent in by Haskell P. Wald (CPF-DB-9)
Comments by Sol Descartes (CPF-DB-9/Add.1) and W. F. Gregory (CPF-DB-3)

12. Fiscal problems in relation to a common market

Panel paper by Cesare Cosciani (CPF-DB-7)
Comments by Mauricio Baca, representative of the secretariat of the Geneva Treaty on Central American Economic Integration (CPF-DB-7/Add.1) and José María Cazal, representative of the Latin American Free-Trade Association (ALALC) (CPF-DB-7/Add.2)

13. General discussion

14. Provisional report of the Conference (CPF-DB-11)

15. Closing addresses

What follows is the text arrived at by the participants at the end of their discussions, which constitutes section C of Part I of the *Provisional Report of the Conference on Fiscal Policy*²

2. FINAL SUMMARY AND CONCLUSIONS³

1. The participants were in agreement that the fiscal policy of the Latin American countries must be closely

² The complete text of the report is contained in document E/CN.12/638, which will be submitted to the tenth session of ECLA.

³ A summary is given here of the main aspects of the problems discussed during the Conference. The aim is to record the

integrated with the economic development plans which these countries are preparing or implementing. Such integration must encompass the financial plans which make economic development a realizable goal.

2. The participants at the Conference likewise agreed that an overriding problem in the fiscal field in Latin American countries was that of increasing public revenue both by means of taxation and through an increase in the income of public enterprises.

3. Increased revenue is essential to enable the countries of Latin America to spend more on purposes essential for development, and on the mitigation of social and economic inequality. It is essential, also, in order to improve the relationship between the level of expenditure and the level of revenue. At the present time most Latin American countries have sizable deficits in their public accounts which are a major cause of their continued inflationary tendencies and which, by swelling profits artificially, also aggravate the inequality in the distribution of income and wealth.

4. The participants were agreed that there is ample capacity in most Latin American countries to increase public revenue and that among the most important causes for the insufficiency of such revenue is the failure of the tax system to impose effective levies on the propertied classes and to collect existing ones.⁴ While the great masses of the population bear considerable fiscal burdens, through indirect taxes of various kinds, and also through personal taxes deducted at source, the benefits derived from the ownership of capital — whether in the form of income, of capital gains or of the spending power derived from the ownership of wealth as such — largely escape taxation. Considerations of equity and of expediency alike require that any major reform of the tax system should ensure that the propertied classes, as well as the working classes, pay their due share of the common burden.

5. There was agreement that a comprehensive reorganization of the existing fiscal systems is urgently called for, and that this must encompass a reform of the structure and administration of existing taxes so as to improve their yield, as well as the introduction of new taxes.

6. The participants recognized that the social, political, legal, and administrative characteristics of the various Latin American countries differ, and that fiscal reform, to be effectively put into practice, must be consonant with local characteristics. However, recognition of such considerations does not imply a modification of the objectives or a reduction of the required pace or pervasiveness of tax reform. It is essential, if the goals of accelerated development and improved distribution are to be achieved, that countries overcome, by special efforts, such barriers

issues on which there was a general consensus of opinion, although in some cases agreement was not unanimous.

The present text, which has been kept as brief and concise as possible, outlines the broad features of the fiscal reform required in the Latin American countries to expedite their development. The specific views of each participant are set forth in the summary records of the various meetings.

⁴ The problems of tax administration were considered during the Conference held at Buenos Aires in October 1961. While the Santiago Conference dealt with problems of fiscal policy, it was recognized that in practice neither subject can be separated from the other.

as may in the past have prevented a comprehensive fiscal reform.

7. The participants, while overwhelmingly supporting the need for augmented public revenue and expenditure, were equally emphatic in insisting on the improvement of expenditure policy. Even in the face of today's inadequate revenues, it was recognized that much wasteful expenditure is undertaken in the Latin American countries. Greatly improved methods of overall investment planning, of project evaluation, of checking the performance of public sector operations, and of control over current expenditures of Governments, are all essential if the burdens of increased taxation are to bear the fruits to which the Conference aspires.

8. The majority of the participants agreed that the most important aspects of a reorganization of the fiscal systems of Latin America relate to the following:

(a) The reform, simplification and up-dating of the system of indirect taxation;

(b) The creation of a comprehensive unitary system of progressive personal income tax, which includes the taxation of capital gains both on mobile and immobile property, complemented by a net wealth tax where feasible;

(c) The collection of more revenue from taxes on urban and rural property, which are additional to personal income taxes on the income derived from such property and which should also be co-ordinated with other forms of special taxation of income from property;

(d) The strengthening of the system of inheritance and gift taxation;

(e) The placing of public enterprises on a self-sustaining basis through the adoption of adequate rates for services rendered;

(f) The harmonization of the tax treatment of the income of foreign enterprises and the taxation of income which residents receive from abroad;

(g) The creation of a fiscal climate which, with the cautious use of incentives, will be attractive to the formation of private capital and its investment in productive enterprise;

(h) The reform of budgetary practices and the inclusion in budgets of the operating results of autonomous agencies; and

(i) The establishment of an objective and co-ordinated system of tax administration, using each tax to give more solidity to the others, so as to guarantee that the benefits of substantial reform will not be lost in administration.

9. Though these measures are discussed separately, the Conference recognized the high importance of considering the merits of any tax system, not on the basis of the effects of individual taxes, but on the basis of the total impact on the economy of the system as a whole.

10. As regards the reorganization of indirect taxation, it was generally felt that such taxation as at present administered is unnecessarily complicated, has undesirable economic effects in distorting the price system, and is also inefficient in terms of yield. It was felt that the reform of the existing systems could be so designed as to produce significant increases in yield and substantial improvements in progressivity while mitigating the economic distortions which such taxation involves.

11. Substantial increases in yield, together with important

administrative simplifications, can be achieved by removing the multiplicity of specific taxes that now exist on articles of mass consumption, and by substituting in their place a single sales tax with a low rate and a broad tax base. Improvement in progressivity, as well as further augmentation of yield, can also be achieved by levying more severe excise taxes on luxury goods consumed predominantly by the middle and higher income groups. Luxury items imported from abroad already bear substantial import duties in most cases, but there is no similarly heavy indirect taxation of home-produced luxury articles, which now, in some countries, account for the greater part of luxury consumption.

12. Some of the participants considered that there is a case for substituting a uniform value added tax in replacement of the existing sales and excise taxes. Such a tax would be payable by enterprises on the difference between their total sales and their purchases from other enterprises — a difference which is approximately equal to the sum of the net incomes generated (in the form of profits, wages, salaries, interest, and rent) by each enterprise. A value-added tax by yielding independent information on the sales of enterprises, would also provide the basic framework for a more effective administration of the whole tax system.

13. With regard to the personal income tax, most of the participants believed that the Latin American countries should aim at the introduction of a unitary system which encompasses all forms of income. It is desirable that a capital gain should be recognized and taxed whenever there is a change in the ownership of either mobile or immobile property — irrespective of whether it is by way of sale, gift, or inheritance. In conditions of substantial inflation, it may be advisable to make some allowance for the increase in the price level in calculating the net gain on capital assets. There is also justification in principle for taxing the imputed rent of owner-occupied dwellings in order to provide equal treatment between owners and renters.

14. It was agreed that an essential requirement for the efficient operation of a personal income tax system is that the rate schedule should be both simple and not immoderate. While it was thought that the exemption levels should be higher in relation to average *per capita* income than those obtaining in the developed countries, it was felt that the existing exemption levels are too high in many cases. The participants agreed that there was no point in starting to levy tax at a very low rate, as is the custom in many Latin American countries, and that there were too many separate tax brackets. It is also an essential precondition of an effective system that the maximum marginal rate of the tax should be moderate. Excessively high marginal rates make it impossible to extend the tax to all forms of income (for example, capital gains) or to eliminate numerous exemptions. They also make it impossible to secure the willing co-operation of the taxpayer; they are the cause of much waste of time and talent in the search for tax loopholes; and they create too great a temptation to corruption and bribery. Hence they are not productive of revenue.⁵

⁵ Social and economic conditions in each Latin American country will dictate the appropriate minimum and maximum marginal rates, but for illustrative purposes it is suggested that the minimum chargeable rate for income in excess of the exempted

15. The Conference gave special attention to the administrative problem of calculating agricultural income for purposes of income taxation. While there was almost universal agreement that some form of presumed income rather than actual income had to be used, there was a difference of opinion with respect to the best way to determine such income. One group suggested that presumed income should be calculated on the basis of average yield of lands with similar characteristics. Others questioned this method as requiring information and technicians not at present available, and suggested that some fraction of self-assessed valuation of property be used as a measure of presumed farm income.

16. The participants were agreed that the ownership of property confers advantages which are distinct from and additional to the income derived from such property. It was suggested, therefore, that in addition to a progressive income tax there should also be a tax on net wealth of individuals or families. For this purpose "wealth" should include property in the form of real estate and financial assets — as well as valuable personal possessions — and "net wealth" should be the excess of the value of such property over liabilities. Such a net wealth tax should be levied at relatively low rates on the wealth in excess of some reasonable multiple of the *per capita* national income. It was recognized that the net wealth tax requires a high degree of efficiency of tax administration, and therefore its introduction in the near-future may only be advisable for countries possessing these administrative prerequisites.

17. While the majority of the participants felt that this tax should be progressive, with low rates (rising, say, from 0.5 per cent to no more than 2 per cent on the excess of wealth over the exempted amount), a substantial minority felt that the tax should be proportional.

18. The participants agreed that the administration of the income and net wealth taxes could be greatly improved if the individual taxpayer were legally required to make a regular and full disclosure of all the real property, stocks, shares, etc., owned by him, and if the tax authorities had legal powers to verify the completeness and accuracy of the taxpayer's returns.

19. Legal and administrative procedures need to be established therefore which enable the beneficial ownership of immobile property and of financial assets to be identified. This requires the compulsory registration of all real property in the name of the beneficial owner and the adoption of means whereby the ownership and transfer of securities (including bearer shares) are comprehensively registered with the tax authorities.

20. An efficient administration of the income and real property taxes also requires the establishment of suitable procedures for the valuation of capital assets at their approximate market value. Under present conditions in Latin America this necessitates a significant strengthening of both the technical and administrative capacity of tax enforcement authorities.

21. The participants were agreed that in the setting of corporation income tax rates countries should balance

amount should be about 10 per cent, and the ceiling marginal rates should not exceed 50 or 60 per cent.

the following considerations: the rates should not be set so high as to discourage domestic investment and risk-taking; on the other hand, the rate should not be set so low as to forgo substantial amounts of tax on the income of foreign enterprises where, as is typically the case, a reduction of the tax paid by such enterprises to the particular Latin American Government would only be offset by a corresponding increase in the tax payable by these same enterprises to the Governments of their home countries. While some progression in rates may be justified to favour small businesses, continuous progression through all income levels, similar to that applying in personal income tax systems, should be avoided. Such continuous progression invites corporate split ups and evasion, impedes the exploitation of economies of scale, and rewards inefficient firms by taxing them at lower rates precisely because their profits are lower than would be the case if they were efficient.

22. It was felt that an effort should be made to rationalize the taxation of income from different classes of property. Traditional taxes in this area include the corporation income tax, the tax on urban real estate, and the tax on agricultural property. It was felt that, in the interest of equity and also of an efficient allocation of resources, the different forms of capital should bear an approximately equal weight of tax, when income and capital taxes are considered together. This consideration suggests the possibility of imposing, where they do not already exist, additional special taxes on those forms of income from capital — such as the profits of unincorporated enterprises, and the interest paid by business firms — which now do not bear any tax comparable to the corporation income tax.

23. Taxation of urban real estate and agricultural property is based in most countries on completely out-of-date valuations, and is in urgent need of reform, both to provide an important source of revenue and also to serve major economic and social objectives.

24. In countries where the ownership of land is highly concentrated, and where the prevalence of absentee ownership militates against the introduction of progressive techniques in agriculture, a progressive agricultural property tax is a potent instrument for inducing efficient use of land, for creating a freer market in land, and for promoting the objectives of agrarian reform.

25. The basic problem in the taxation of urban and agricultural properties is to obtain adequate assessments, i.e., to determine the tax base. The participants considered two methods as possible substitutes for a supplement to the traditional one of direct valuation by fiscal officers.

26. The first was the method of self-assessment — the declaration by the owner himself of the value of his property. This declaration would be placed on public record, and any individual or enterprise would be free to make a *bona fide* bid to purchase the property. In the event of such a bid exceeding the owner's declared value by a significant amount (say 20 per cent), the owner, if he chose not to sell, would be required to revalue his property up to the amount which was bid. In this case the maker of the frustrated bid would be entitled to a premium, which might be in the amount of the extra tax obtained in the first year following the revaluation of the property.

Where inflationary problems are of serious dimensions, provision would have to be made for the automatic readjustment of assessed values during the period between successive declarations required of the owner.

27. Some participants thought that the self-assessment system was likely to be superior to the traditional system even where this latter system was well administered; others considered self-assessment to be desirable over a transitional period during which the administrative means would be developed for an adequate assessment by fiscal officers. A further group felt that the principle of self-assessment was a good one, but that the mechanism for enforcing proper declaration should be legislation authorizing the fiscal authorities, on their own initiative, to acquire properties at the values declared by their owners. This variant has in fact been applied by a number of countries in the implementation of their agrarian reform programmes.

28. The second method, considered in the case of agricultural but not urban property, was the assessment of land on the basis of its potential yield, taking into account the data provided by cadastral surveys.

29. The Conference felt that there should be progressive taxes on inheritance complemented by similar taxes on *inter vivos* gifts. These serve the purpose of reducing the importance of inherited wealth in the distribution of wealth and income — an objective which is distinct from the general goal of progressive taxation, namely that of reducing economic inequalities. If the recommendations made above concerning the full disclosure of property in connexion with income tax are adopted, the administration of inheritance and gift taxes will no longer present special difficulties.

30. It was felt that many Latin American republics fix the prices of services provided by public enterprises at unjustifiably low levels, thus depriving their Governments of an important source of revenue. It is not often realized that the greater part of these services is sold, not to the final consumer, but to private enterprises, with the effect that the profits of private enterprises are artificially raised at the same time as the profits of public enterprises are kept at low or even negative levels. The participants felt that a reasonable goal of price policy for most public sector enterprises would be to obtain profit rates comparable to the gross-of-tax profit rates achieved in the private sector. This is especially important in Latin American countries where the profits earned in public enterprises can provide a significant source of financing for the needed expansion of their operations.

31. It was likewise felt that in the countries of Latin America the provisions of the law relating to foreign enterprises are relatively better administered than other provisions. However, attention was drawn to the fact that in a number of countries substantial concessions may have been granted to attract foreign investment. This is particularly true when the problem is considered from the point of view of the undeveloped countries as a whole. Concessions made by any one country if successful, are more likely to divert the flow of funds from other countries than to increase significantly the total flow of such funds. In addition, attention was drawn to the fact that it was possible in some cases for international companies

to understate the value of their exports — or to overstate the value of their imports — and thereby show a smaller profit on their local accounts than the true profit arising from their local operations. The Conference felt that both for the purpose of limiting undue concessions to foreign companies and for the purpose of ascertaining the true profit of such companies to be taxed, there was need for international consultations, aimed at the adoption of uniform principles in the tax treatment of foreign enterprises.

32. The Conference felt that there was a strong case on equity grounds for extending the liability for income taxation to income received from abroad — as is already the case in most European and North American countries — particularly since the residents of many Latin American countries own very substantial amounts of capital abroad. It was felt that in order to enforce such provisions the co-operation of foreign countries should be enlisted to provide information of income received by residents of Latin America. It is known that some countries already provide such information on a mutual basis under international tax treaties.

33. The participants recognized that tax incentives can be a potent instrument of economic policy, both to induce resources into desired uses and to impede their use in less desired areas. These incentives, however, have in the past had the effect of producing substantial revenue losses in most cases, while producing limited or even negligible positive economic effects in many others. It is essential therefore, that extreme caution should be exercised so that tax incentives have a high expectation of producing

the desired effect with minimum loss of revenue; and it is a reasonable goal of policy, when incentives in a particular direction are contemplated, to contrive methods which accomplish this aim without any revenue loss. In the particular case of investment incentives, it was noted that it is not easy to devise and administer an efficient system, and that the use of these incentives is more powerful in influencing the character of investment than in increasing total investment.

34. The Conference was in agreement in applauding the recent trend toward the development of common markets among the Latin American countries. It was noted however that as successive reductions of trade restrictions occurred, they might create transitory fiscal difficulties for some of the participant countries. The Conference also emphasized the need for preventing differences in fiscal provisions among the countries involved from producing undue distortions in the patterns of production and trade, and stressed the importance of further research in this area.

35. The participants indicated that for the implementation of reforms, the administration of the tax system, and the analysis of the effects of taxation, there is an urgent need for improvement in the quantity and quality of statistical data, and for a substantial augmentation of the supply of technical experts of the highest professional capacity. They urged that Governments and international agencies continue their present efforts and undertake new and additional measures to accommodate these needs so as to make the fiscal reforms which have been the subject of the present Conference as effective as possible.

III

LATIN AMERICAN SEMINAR ON HOUSING STATISTICS AND PROGRAMMES

1. FOREWORD

The Latin American Seminar on Housing Statistics and Programmes was convened under the United Nations Long-range Programme of Concerted International Action in the Field of Housing and Related Community Facilities. It was held from 2 to 22 September 1962 at "Røllighed" near Copenhagen and from 23 to 25 September at Stockholm, Sweden. The Seminar was sponsored jointly by the United Nations and the Government of Denmark, with the collaboration of the Statistical Office, the Bureau of Social Affairs, the Housing, Building and Planning Branch, the Bureau of Technical Assistance Operations, the Economic Commission for Europe and the Economic Commission for Latin America. The Department of Social Affairs of the Pan American Union, the Inter-American Statistical Institute, the Latin American Demographic Centre and the Inter-American Housing and Planning Center also took part. The Government of Denmark assumed responsibility for the direction of all the Seminar activities conducted in that country. Danish experts participated in the discussion of all the topics on the agenda and gave an account of the way in which the different housing programmes were being carried out in their country. ECLA was responsible for the organization of the Seminar, the co-ordinated preparation of documents and their translation and publication.

The Seminar formed part of a series of meetings on

housing statistics and programmes that are being organized for the benefit of representatives of housing institutes and statistical offices in the developing countries in different parts of the world. The first was held at Zagreb, Yugoslavia, in October 1961. The Copenhagen Seminar, which was the second in the series, was designed to serve the needs of Latin America, where rapid industrialization and a high rate of population growth, coupled with the great changes brought about by the migration of the population from rural to urban areas, have created an acute housing problem. Apart from the well-known fact that large sectors of the population in Latin America live in appalling housing conditions, the housing shortage that already existed in 1950 became even worse in certain countries during the next succeeding ten years. The trend of events has been confirmed to some extent by the preliminary results of the 1960 censuses which show that a policy based on comprehensive statistics and better methods of estimating housing requirements and resources are urgently needed. The Seminar provided an opportunity for studying such methods, as well as the possibilities of obtaining the requisite statistics to enable measures to be taken to alleviate the critical housing situation.

The Seminar was attended by thirty-one participants from sixteen countries. Since its main purpose was to provide an opportunity for an exchange of views among persons engaged in the collection and analysis of housing data and those responsible for the formulation and exe-

cution of housing programmes, Governments were invited to send representatives from statistical services, housing institutes and planning offices.

In accordance with the agenda prepared for the Seminar, and as a starting-point for the discussion on the formulation of housing programmes and the statistics required, it was proposed:

(a) To study the housing situation and trends in Latin America, and to make a general assessment of the statistics available, housing requirements and the efficacy of current housing programmes;

(b) To study the targets, aims and characteristics of national housing programmes and the organization of housing institutes in the Latin American countries;

(c) To review the availability of basic statistics required for housing programmes and organizational arrangements for their compilation;

(d) To evaluate the role of regional organizations connected with housing in Latin America.

The Seminar then proceeded to consider the principal aspects of the formulation of housing programmes, with special reference to the following:

(a) Planning of housing as part of an over-all economic and social development plan;

(b) Regionalization of over-all housing programmes. Planning at the local and project levels;

(c) Adoption of statistical indicators for housing conditions in the Latin American countries;

(d) Methods of estimating the present housing deficit and future housing requirements in Latin America;

(e) Evaluation of present and future resources needed for housing construction;

(f) Administrative and institutional arrangements for the formulation of housing programmes.

In order to ascertain the statistics required for the formulation and execution of housing programmes, and to devise ways and means of obtaining them, the following items were considered:

(a) Housing censuses;

(b) Sample housing surveys;

(c) Current statistics;

(d) Permanent housing records;

(e) Demographic statistics and projections for housing programmes;

(f) Statistics required to estimate investment in dwellings, household income and construction costs;

(g) Administrative and organizational arrangements required for collecting statistical data for housing programmes.

Some of the main ideas and opinions expressed during the discussions on the different topics are summarized below.

2. HOUSING PROGRAMMING

The housing problem in Latin America cannot be tackled without a plan. The existing shortage and the additional requirements constantly emerging as a result of population growth, the need to replace dwellings and to provide increasingly high housing standards in keeping with general progress and demographic growth, must be dealt with by means of constant investment on a sufficiently large scale to cover requirements.

There is a fairly elastic choice of programming methods, depending on the data available and on the nature of the problem in each country. It should be recognized, however, that a number of essential factors common to all of them

should be taken into account in the preparation of any national housing plan, and that it is indispensable to have certain basic statistics.

(a) *Housing programmes and their relationship to over-all economic development plans*

An analysis of the housing problem and the formulation of housing programmes should be an intrinsic part of the analysis of economic development in general, in order to determine: (i) the most suitable amount to be invested annually in housing in relation to the total amount of possible national investment; (ii) the best way of distributing investment among the different types of dwellings for population groups classified by level of income; (iii) the best way of distributing the dwellings built in accordance with different housing standards so that they are in keeping with the resources available; (iv) possible sources of financing; (v) the amount of investment needed to expand production of building materials; and (vi) the incentives or methods that should be adopted to ensure that a sufficient number of new dwellings are built for the lower-income sector of the population.

(b) *Nature of housing programmes*

A national housing programme is a plan prepared by a national agency and designed mainly to set up targets for the construction of new dwellings and their characteristics over a year or a given number of years (usually five to ten). There are several kinds of programme. Some may consist strictly in a direct housing plan based on a thorough and detailed study of available resources, and intended to be put into practice under vigorous control. Another type of programme may be simply a projection of construction which could be carried out during a given period, with an indication of the measures that should be taken to induce investors and constructors to build a specific number of dwellings of the kind deemed necessary to ensure the maintenance or improvement of existing conditions. As a rule, national housing plans combine the two types of programme. Housing construction targets are fixed directly by government institutes or corporations, and the volume of building to be undertaken by other investors and constructors is determined. In this way the proportion of a country's housing that can be built by the direct intervention of State agencies is ascertained. In the case of a Latin American country it is estimated at 85 per cent and in others at 70 per cent.

(c) *Statistics for housing programmes*

A large variety of statistical data is required to prepare national housing plans. In the course of the Seminar an attempt was made to determine the basic statistical information needed for formulating housing plans and specific proposals were put forward on the statistics required for the salient aspects of programming.

In general it may be contended without any exaggeration that the statistics available in Latin America for the purposes of housing programming are both insufficient and unsatisfactory. When censuses were taken in 1960, fewer countries made housing surveys than in 1950. Moreover, the concepts used by some countries for their censuses make it difficult to apply the data for programming purposes. Consequently it is extremely difficult to discover the total numbers of adequate or inadequate dwellings existing at a given date, even in some of the countries that have taken censuses. It is also no easy task to

ascertain the number of private households. As regards the formation of households, reliable and up-to-date information on the number of marriages and particulars relative to the heads of private households is usually unobtainable. Furthermore, estimates on the volume of internal migration are often very unreliable. Information on building firms is not available, still less on housing construction capacity.

3. GENERAL CONCLUSIONS

Summing up the discussions, the Seminar reached the following general conclusions:

1. To recognize and reiterate the importance of formulating long-term national housing programmes within the context of over-all economic development plans as a means of achieving the most effective utilization of resources and of ensuring that the improvements effected in housing conditions are consistent with the requirements of general economic development. For such programmes to be carried out it is necessary to have a national agency with full responsibility for formulating national housing policy and the necessary authority and means to implement any national programmes adopted in accordance with the established housing policy.

2. To recommend that, on the basis of the experience accumulated to date and of the general principles discussed at the Seminar, a suitable methodology be developed for the formulation of housing programmes including, in particular, methods for estimating building requirements to satisfy minimum housing needs. Such methods should be developed with due regard to their applicability in Latin American countries.

3. To recommend to Governments and to international and regional agencies that priority be given to the collection and improvement of the basic statistics needed for housing programming, in particular to population and housing

censuses and to current housing statistics. In this connexion, the following were felt to be effective methods:

(a) To establish a department or section on housing statistics in each national statistical office and to provide for effective co-ordination of its activities with those of housing institutes and other agencies concerned with housing programmes in the different countries;

(b) To establish sample survey units in the national statistical offices;

(c) To strengthen the co-ordination between the national statistical offices, housing institutes and economic planning offices by forming national housing committees or by other means;

(d) To organize national seminars on housing statistics and programmes along the lines of the Copenhagen Seminar or on specific subjects, as for example the development of concepts and statistical methods for estimating housing investment; measurement of construction capacity; evaluation of construction costs; estimation of housing shortages and future housing needs; development of specifications for current statistics on housing financing and marketing; or simply objective interpretation of census results and changes in housing conditions.

4. To provide frequent opportunities for an exchange of experience among housing experts and statisticians in the various countries of the region. In this connexion, the experience of the Sub-Committee on Housing, Building and Planning, the Central American Economic Cooperation Committee of the United Nations Economic Commission for Europe were considered to be valuable precedents which might be useful for the diffusion of a regional system for the promotion of better housing conditions in Latin America.

5. To recognize the need to train personnel in the general fields of housing programming and housing statistics and particularly in physical planning and methods of data processing with the aid of electronic equipment.

IV

RELATION BETWEEN COMMUNITY DEVELOPMENT AND NATIONAL DEVELOPMENT PROGRAMMES

1. INTRODUCTORY NOTE

The problem of the use of community development concepts and techniques as a basic instrument in the process of economic and social development, especially in rural areas, has for some time retained the attention of those concerned with the transformation of traditional rural cultures and with the necessity of raising the level of living of the rural population. It is also a fact that acceptance of community development has been rather slow in Latin America. In 1957, in a document prepared for a Seminar on Training for Social Work in Latin America held that year in Montevideo, the ECLA secretariat could write that there was "an urgent need to bring the rural areas into step with the time through the employment of every possible economic, technical, social and educational means, as is now being attempted. It is all the more surprising, therefore, that the forms of action embodied in the idea of community development have been so apathetically received in our area..." It went on to underline the objective consisting in "the formulation of community development programmes properly suited to

the conditions and possibilities and the living and working habits of the different Latin American countries".¹

The situation has changed considerably in recent years, as various countries have given increased emphasis to community development in the framework of their concern for economic and social development. Pilot projects have been launched to demonstrate the usefulness of the community development technique. In several countries, in particular in Bolivia, Colombia and Venezuela, a nationwide community development programme has been adopted, and other countries are taking steps in the same direction. In connexion with this effort, no fewer than eight countries in Latin America have requested and obtained technical assistance from the United Nations.

In light of these developments, the United Nations, with the co-operation of the Government of Ecuador, organized in Quito, from 2 to 15 December 1962, a *First Workshop on Organization and Evaluation of Community Development in Latin America*, which brought together, for an exchange of experiences and ideas, participants

¹ See E/CN.12/482, page 2.

from several countries,² as well as United Nations technical experts working in this field in Latin America, and representatives of interested specialized agencies, the Regional Fundamental Education Centre for Community Development in Latin America (CREFAL) and the Organization of America States (OAS).

The ECLA secretariat also participated in the Quito Workshop and, in line with the main emphasis of its activities at the present time, presented to the meeting, through the Director of the Social Affairs Division, a paper on *The Role of Community Development in Over-all Plans for Economic and Social Development*, for consideration under the agenda item on the relation between community development and national development programmes. The interest with which this paper was received by the Workshop only reflected the fact that the problem of integrating their community development effort with over-all planning is, at this time, a subject of major concern for several countries. The text of the paper is reproduced below.

2. ROLE OF COMMUNITY DEVELOPMENT IN OVER-ALL ECONOMIC AND SOCIAL DEVELOPMENT PLANS

As a point of departure, it will be useful to recall the two predominant characteristics of economic and social policy in Latin America today. The topic to be discussed here is the determination of the role of community development in over-all economic and social development plans. And the characteristics in question are as follows: (a) general acceptance of planning as a method of ensuring rationally-ordered development; and (b) at the same time, a new definition of the concept of development.

The present article is not the place for a review of the historical process which has culminated in the new situation described. Suffice it to note that although this process is not yet complete, and that in consequence certain doubts and divergencies arise, there is, on the one hand, widespread recognition of the need for development planning, and, on the other, awareness that the development in question is by no means of the purely economic sort expressed in such technical macro-aggregates as the "gross national product" or "national *per capita* income".

Progress is being achieved in the attempt to give the concept of development a new dimension, incorporating economic and social elements alike, so that in its final form it will imply genuine integration. But as regards the research which this integrated concept of development entails, almost the whole of the effort has yet to be made, since it presupposes a new type of humane rationalism which transcends the typical rationalism of classic economic theory. The fact remains, however, that the existence of the problem has been fully acknowledged, and we must abide by this revised conception and try to direct our endeavours towards the attainment of this new landmark, dim though its outlines may seem at present.

These remarks have a very direct and intimate bearing on the subject of the present paper, since they indicate the general framework in which the community development problem presents itself in Latin America today. The hackneyed discussion of the significance of community development programmes for a country's economic progress may be dismissed as completely out-of-date, for the

point at issue is not whether these programmes can constitute a decisive factor in economic development, or whether, on the hand, they can exert only a limited influence unless they operate concurrently with other factors, such as agrarian reform, for example. The question is no longer whether community development can or cannot stand alone. The over-all framework and the basic method for economic and social development have been precisely formulated, and consequently all that matters in this connexion is to determine how efforts in the field of community development can best be channelled in a direction that will be beneficial from the standpoint of over-all development.

It would be a grave mistake to interpret the foregoing statements as setting limits to the role of community development, or as detracting from its value inasmuch as they imply the loss of the independence which, as must be acknowledged, has been enjoyed by the agencies and individuals working in this field of activity. On the contrary, within the new concept outlined above, the opportunities open to community development will be considerable, since in so far as by its very conception it is ranked as an instrument — an efficacious tool — for both economic and social purposes, it can be made to play an extremely useful part in the over-all economic and social development effort, in relation not only to a few more or less isolated communities, but to the country as a whole.

The topic appearing on the agenda — the role of the community in economic and social development plans — cannot be thoroughly dealt with in the present paper, where all that is attempted is to lay the indispensable emphasis on the fundamental significance of community development as an agent of social change, in so far as the latter is at once the cause and the effect of economic development. Suffice it, therefore, to recall the considerable, even if indirect, influence that may be exerted by a community development programme on the capacity of the community itself to contribute to the attainment of the over-all targets set up under an economic development plan. It must be recognized that the full implications of the term "community development" have not yet been properly studied, and that the lack of sufficient experience and of a body of established doctrine means that we have no solid ground under our feet. All that can be discerned are various signs of lively interest in the relation between community development and over-all planning, and to this some reference will now be made.

(a) *Inter-sectoral nature of the community development programme*

In accordance with the technique currently in use for economic and social development planning, every over-all development plan, after a global analysis of the problems to be confronted and the objectives pursued, presents a detailed analysis of the action contemplated in each of the several sectors it covers: agriculture, mining, industry, transport, education, public health, housing, etc. Such "sectoral plans" constitute the basis for the formulation of specific projects and for the determination of medium and long-term public investment, as well as — in ideal circumstances — for the preparation of the national budget. A community development programme necessarily relates to several aspects of community life which are an integral part of the various sectors with which planning

² Representatives of Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador and Venezuela attended the meeting. Mexico had also been invited, but did not participate.

at the national level has been concerned. The clearest case in point is the expansion of agricultural production; but highly illustrative examples are also to be found in the improvement of the agricultural infrastructure, building of school premises, extension of health services, provision of better housing, etc.

When a community development programme is examined in the light of its relation to the over-all economic and social development plan, it is seen to be, from every point of view, of an eminently inter-sectoral character. The results expected of such a programme fundamentally affect the agricultural sector, the education sector and the public health sector alike. In certain circumstances, they may have repercussions on the housing sector, or even on industrial development, when the programme concerned includes artisan and small-scale industry. Lastly, it may certainly influence the transport sector at the micro-level of the community, when it makes some contribution to the improvement of the road system.

Consequently all these cases raise the problem of establishing community development targets in terms that can be precisely defined from the standpoint of the objectives of the over-all economic and social development plan, i.e., with a view to a clearer understanding of the way in which the two efforts should be linked up. There are certain elements in a community development programme which will not correspond to any particular part of the over-all plan; this latter does not include a section specifically relating to the promotion of social change. And, conversely, there are sections of the over-all plan which are not parallel to any specific aspects of the community development programme, such as, for instance, that relating to prospecting for petroleum. But this does not mean that vital importance should not be attached to the determination, sector by sector, of the common ground of interest and practice where both the over-all plan and the community development programme converge.

(b) *Complementary nature of the community development programme*

The demarcation of this common ground leads up by a logical transition to the next point in the present article, which is perhaps the heart of the matter: namely, the complementary nature of the community development programme in relation to the over-all economic and social development plan. The one thing the community development programme does is to complement the aggregate effort envisaged and programmed in the over-all development plan for the sectors indicated above. This complementarity takes the form of a twofold and significant contribution to the aggregate effort in question, consisting in (i) additional resources; and (ii) additional techniques. In both cases the aim is the same: to ensure fuller achievement of the objectives established under the over-all plan. The additional resources are in essence human resources, obtained through the mobilization of the community's latent work capacity. Thanks to the energies released by the community development programme, a specific number of work-hours becomes available for the fulfilment of certain tasks which otherwise would call for special effort on the part of the State or of private enterprise. What is more, the application of additional techniques will also extend this utilization of extra "personal" resources to resources of a "material" type. The adoption

of methods adapted to the community, with the backing of the technical assistance accessible under a community development programme, will mean, for example, that a bag of cement for the building of school premises acquires a much higher final value if it passes through the channels established under such a programme, than if it is used only in the framework of an over-all public works programme. The community will be capable of contributing to the production of material goods — for the construction of adobe or wooden buildings — which would not be available but for the results achieved under the programme.

The determination of this complementarity is a task of decisive importance for clarifying the relations that can and must exist between a community development programme and an over-all economic and social development plan. A clear grasp of these relationships may make all the difference, in more than one country, between active acceptance of the community development programme as an essential instrument of over-all development — with all the implications, including those of a financial nature, which such acceptance involves — and the implementation of the over-all programme by those responsible for the economic and social development of the country, who may regard community development as a laudable but in some measure marginal activity.

(c) *The community development programme as an administrative instrument for the implementation of the over-all economic and social development plan*

Time and again experience has shown that the object of a community development programme is often the rehabilitation of rural communities that have hitherto been living almost out of reach of the various facilities provided by the public sector in the fields of agricultural extension services, education and health. Even where it has been possible to make such facilities available to the communities in question, they have been provided sporadically and with only limited efficacy. It is from this standpoint that a community development programme should be evaluated. With its inter-sectoral approach, its co-ordinated mechanisms and its special techniques it can represent a very effective instrument for consistently carrying the services of the different Ministries into areas which their official action has not as yet reached. The community development programme thus becomes a vehicle to ensure the proper diffusion of public services in rural areas, and in this way plays what is no doubt a decisively important part in relation to the application of an over-all economic and social development plan. The aggregate development effort generates considerable substantive and administrative requirements which must be met in each individual sector as the over-all plan is put into operation. This is particularly true of those parts of a country which have been badly served or neglected in the past. A substantive and administrative mechanism created for the purposes of a community development programme — a mechanism which by its very nature is inter-sectoral — can furnish, in the sectors it covers, the requisite means of solving as rationally as possible the problem of the expansion of the public services network. All this is in itself another aspect of the above-mentioned complementarity between an over-all economic and social development plan and a community development programme. But here too the elucidation and exact

definition of this complementarity are indispensable for maximum utilization of the potential resources which such a programme affords.

(d) *The community development programme as a channel of communication for popular participation in the work of planning*

No one attempts to deny that up to the present the work of over-all economic and social planning has frequently been the outcome of rational effort on the part of a minority. And although it is recognized, as is only fair, that this minority is working for the common good, it is none the less true that planning has been and still is a centralized intellectual activity. However, planners themselves are nowadays laying ever-increasing emphasis on the need for popular participation in the process and planning of development. The idea is daily gaining ground that in the long run, and particularly in so far as the prospect of reaping the benefits of development constitutes an incentive for the broad masses of the population, it is essential that these latter should share the responsibility for development planning. Although this is perhaps a long-term view, allusion should be made here to the possible role of a community development programme as a channel of communication between the public and the planner. In their daily contacts with communities, the agents of such a programme can measure reactions to the efforts to attain plan targets, determine the degree of acceptance or opposition encountered, and, lastly, form an impression of the claims and aspirations voiced at the level of the "end consumer", so to speak. If it can be ensured, by virtue of the mechanism of a community development programme authentically integrated with over-all economic and social planning, that all this information reaches the level at which the development effort is formulated and its guiding principles laid

down, a superlatively efficient instrument for the encouragement of popular participation in that effort will be obtained. Clearly, this is not likely to happen in the very near future, and the problem is a highly complex one, impossible to solve by rigid formulae and involving risks of demagogic abuse. Even so, it seems obvious that the role of a community development programme linked to an over-all economic and social development plan and conceived from the standpoint of the country as a whole is deserving of the closest attention, when serious consideration is being given to the importance of popular participation in the development effort.

(e) *Need for integration of community development and over-all economic and social development planning*

Although the foregoing discussion touches upon only a few of the most salient aspects of the problem, as they have emerged within the limited range of experience recorded to date, it clearly and decisively indicates the indispensability of a systematic effort to secure the authentic integration of community development planning with the planning of over-all economic and social development. So far this line of thought is almost unexplored, and an energetic intensification of intellectual research is consequently called for. Little knowledge exists on the subject, and both parties will have to co-operate in this effort: the planning agencies will have to broaden their outlook and devise ways and means of measuring and incorporating the role of community development in over-all economic and social development planning. In their turn, community development agencies will have to demonstrate their ability to visualize their activities as a function of over-all planning. Neither will have an easy task. But this is the only possible way of achieving a rational over-all approach to the development problem.

V

PROBLEMS OF THE ELECTRICITY INDUSTRY

1. EXPERT MEETING ON ELECTRICITY STATISTICS AND TERMINOLOGY

An Expert Meeting on Electricity Statistics and Terminology, convened on ECLA's initiative and sponsored jointly with the United Nations Bureau of Technical Assistance Operation (BTAO), was held at ECLA headquarters, Santiago, Chile, between 24 and 29 September 1962.

The meeting was the outcome of a recommendation of the Latin American Electric Power Seminar (Mexico City, 31 July to 12 August 1961) which reads: "The ECLA secretariat should be requested to organize a study group for the purpose of proposing to the Latin American countries the use of a standard system of electric power consumption statistics and of a common terminology in all aspects of the electricity economy, in order to allow a constant interchange of information to take place."¹

Eleven plenary meetings were held, attended in a private capacity by experts from Argentina, Chile, Costa Rica and El Salvador. Invitations were extended also to three

other experts, from Colombia, Mexico and Peru respectively, but unforeseen difficulties prevented them at the last minute from attending. The Chilean *Empresa Nacional de Electricidad, S. A. (ENDESA)* sent two observers who took an active and effective part in the work. ECLA was represented at the discussions by staff members from the Energy and Water Resources Programme, the Statistical Division and the Editorial Section.

The essential purpose of the meeting was to prepare a glossary and a set of statistical tables aimed at standardizing the terminology and basic data of the electricity economy in the Latin American countries. As a basis for discussion, the ECLA secretariat presented a document entitled "*Proyecto de glosario y modelos de cuadros estadísticos en economía eléctrica*" (E & WR/WP.1/2) prepared by the Energy and Water Resources Programme.

The point was made that it was important for each country to have accurate knowledge of the position and development of its electricity industry both as a guide for determination of immediate action to promote the normal development of the sector and to bring its electricity programming into line with economic development as a whole. Demand projections, the study of available energy resources and an estimate of the investment required are

¹ See report of the Seminar (E/CN.12/AC.50/4), paragraph 123 (d).

some electricity planning problems that cannot be solved without adequate statistics. Emphasis was also placed on the importance of statistics in the economic operation of electricity systems, the administration of electricity companies and the work of the corresponding regulating agencies (load distribution among plants, rate-fixing, etc.).

It was generally agreed that a standard nomenclature in electricity economy matters was highly important for the exchange of information and experience among the Latin American countries. Such standardization could greatly assist the development of electricity in Latin America and the exploitation of catchment basins of concern to more than one country.

The experts unanimously agreed to confine the scope of the glossary to those special terms which, while required in electricity economy, have so far not been included in economic, legal or administrative terminology.

Before the glossary was prepared consultations were held with such authoritative institutions as the International Union of Producers and Distributors of Electric Energy, the World Power Conference, the International Electrotechnical Commission, the International Federation of Industrial Producers of Electricity for Own Consumption, the Organization for Economic Co-operation and Development, the United States Federal Power Commission, the Edison Electric Institute and *Electricité de France*, and whenever possible their publications on the subject were taken into account.

The tables consulted in the preparation of the statistical tables were chiefly those approved by the World Power Conference and the Economic Commission for Europe, as well as those which ECLA has been using for years.

The experts also considered how the glossary and models of statistical tables could be most effectively brought to the attention of, and adopted by, the competent quarters in the Latin American countries, and recommended that the ECLA secretariat's normal channels of communication should be used to that end. It was further recommended that they should be brought to the attention of universities, professional associations, national electric industry chambers, institutes of standards, State-owned enterprises and regulating agencies, and that the views of those bodies should be sought in regard to the glossary and models of statistical tables approved at the meeting.

2. EXPERT MEETING ON RATE STRUCTURE BASES IN THE LATIN AMERICAN ELECTRICITY SECTOR

A Meeting of Expert Bases for Electricity Rates in Latin America convened by ECLA and sponsored jointly with the United Nations Bureau of Technical Assistance Operations (BTAO), was held at ECLA headquarters, Santiago, Chile, from 10 to 21 December 1962.

As regards the background of the meeting, reference should be made to the following recommendation by the Latin American Electric Power Seminar held at Mexico City (July-August 1961): "That the ECLA secretariat convene, at the earliest opportunity, a meeting of experts to study the problems of electricity rates, so that the respective analyses and conclusions may serve as a basis for the adoption of adequate policies by Latin American electricity enterprises."²

² See the report of the Seminar (E/CN.12/AC.50/4), paragraph 212 (c).

The meeting was attended in a private capacity by ten experts from Argentina, Chile, Costa Rica, France, Peru and Uruguay. An expert from Brazil and one from Mexico were unable to attend because of unforeseen difficulties. Five Chilean experts sent by the *Empresa Nacional de Electricidad, S. A. (ENDESA)*, the *Compañía Chilena de Electricidad Ltda.*, the Office of the Director-General of Electricity and Gas Services, and the Faculty of Physics and Mathematics of the University of Chile, also attended. Staff members of ECLA's Energy and Water Resources Programme acted as secretariat for the meeting.

The discussion centred on the following topics:

1. Principles on which to base a rate policy. Cases in Latin America
2. Existing rate systems and those used in Latin America
3. Rate-fixing. General aspects
4. Rate-fixing. Accounting aspects
5. Rate-fixing. Financial aspects
6. Rates and financing of electricity development in Latin America
7. Electricity rates and their relation to fiscal policy problems
8. Legal, institutional and administrative aspects in Latin America

In connexion with the above, the following documents were presented:

- *Política y estructura tarifaria en el sector eléctrico*, by Alejandro Vegh Villegas (E & WR/WP.2/1)
- *Introducción al estudio del régimen jurídico e institucional de las tarifas eléctricas en América Latina*, by Guillermo J. Cano (E & WR/WP.2/2)
- *Principios de tarificación eléctrica*, by Eugenio Salazar (E & WR/WP.2/5)
- *Algunos problemas relacionados con el método de fijación de tarifas de acuerdo con la ley de servicios eléctricos chilena*, by Renato E. Salazar (E & WR/WP.2/4)

In addition to the documents included in the above agenda, the participants also had before them the three following documents, the first two presented by Mr. Raúl Schkolnik B. (ENDESA) and the third by Mr. Rodrigo Orozco.

(*Instituto Costarricense de Electricidad*):

- (a) "Algunas consideraciones generales sobre el comportamiento estadístico de los consumidores residenciales";
- (b) "Aplicación de un método de tarificación horaria a dos casos sencillos";
- (c) "El costo del servicio para el proporcionamiento hidrotérmico".

The following are some of the principal conclusions reached at the meeting:

- (a) The average price charged for the sale of electric power should cover the average cost of the service — under normal operating conditions — including a reasonable profit; there is no reason why the profit should be different for a State-owned enterprise than for a

private enterprise, if conditions in the country are the same for both;

(b) In fixing the lawful profit, it was felt that it should range between a minimum equal to the interest rate at which the State effects its borrowing and a maximum which might be the opportunity cost of capital;

(c) It is feasible for electricity enterprises serving systems with a moderate growth rate (6 to 8 per cent annually) to finance their expansion through the depreciation fund, reinvestment of net profits and contributions from international financial agencies without resorting to high rates, that is to say those which imply a real yield of more than 10 per cent of the enterprises immobilized assets;

(d) In making investment decisions electricity enterprises — particularly those financed by government capital — should consider the opportunity cost of money instead of the "lawful profit" which is usually less;

(e) Within a general rate level consonant with the principle of recognizing real costs plus a reasonable profit on investment, the possibility was admitted that the rate structure might be so oriented as to imply a measure of subsidy, provided that the subsidy was made clear and reflected an over-all economic policy;

(f) The prices of different energy resources should be so co-ordinated as to ensure, where alternatives are available, that the decisions taken are economically sound from the national standpoint;

(g) Recognizing that the important principle of incentives to improved efficiency (technological or administrative) is not taken into account even in the most modern Latin American legal systems, it was recom-

mended that net economies in unit cost should, as a general rule, be divided between the producer and the consumer after deduction of all the benefits deriving from factors not attributable to the action of the enterprise itself, such as reductions of input prices. It was pointed out that periodically (e.g. every five years) a new basis of comparison should be established to ensure that the profit-capital investment ratio does not become disproportionate as a result of rapid technological progress or improvements in an enterprise which began with very low levels of efficiency;

(h) Emphasis was placed on the desirability of establishing a uniform system of accounts, chiefly in order that the enterprise's activities might be estimated by physical-functional groups and a record kept of the cost of its services, also from a functional standpoint. The corresponding statistical comparisons in Latin America would thus be facilitated. The establishment of a working group for this purpose recommended:

(i) Electricity enterprises should include in the annual reports to their share-holders a balance sheet prepared not only in accordance with the laws governing limited companies, but also in accordance with the characteristics of the electricity industry.

(j) If electricity enterprises obtain loans guaranteed by the State, the profits accruing therefrom should not be theirs alone but should also equitably benefit the consumer;

(k) The assets of enterprises should, at reasonable intervals (e.g. every five years) be subjected to itemized assessment, but during the intervening periods a system of automatic re-assessment based on a suitable over-all index should be applied.

METHODOLOGICAL NOTES

THE CONCEPT OF TERMS OF TRADE AND METHODS OF COMPUTATION

The concept of "terms of trade" plays an important role in the theory of international trade and is widely used in current economic analysis. It appears, however, that the actual statistical measurement of the concept is insufficiently known and this results in a number of misinterpretations of the data.

From the beginning, ECLA has made extensive use of data on terms of trade for the region as a whole and for the individual Latin American countries, computed by its secretariat, and it may be useful to explain in some detail the sources and methods used in the computation. The purpose of the present notes is to make a critical review of the basic material utilized for the estimates, as well as of the statistical problems involved in the elaboration of terms of trade indexes for Latin American countries.

In the first section, a simplified description of the basic concepts and methods will be given, while in the second part these will be illustrated by a detailed review of the existing data for Chile. For a deeper analysis of the methodological aspects, the reader is referred to the statistical annex.

1. MEASUREMENT OF TERMS OF TRADE

(a) *The concept of "terms of trade"*

If it is assumed that trade between two neighbouring¹ countries is balanced and consists only in exchanging wheat from country A against steel from country B, the terms of trade are equal to the ratio in which wheat and steel are exchanged against one another. As an illustration, if it is assumed that one ton of steel pays for 3 tons of wheat in the base year and 4 tons in the year under review, the terms of trade of country A have deteriorated by one fourth while those of country B have improved by one third.

If it is assumed that in the base year the flow in each direction amounted to 30 units of currency and to 60 units in the compared year, it is easy to derive the prices of each commodity for each year, as follows:

	Prices per ton (currency units)		Price index Base year = 100
	Base year	Compared year	Compared year
Wheat	10	15	150
Steel	30	60	200

A similar measure of the terms of trade index is obtained by dividing the export price index by the import price index for each country, i.e. $\frac{150}{200} = 75$ for country A and $\frac{200}{150} = 133$ for country B.

¹ i.e. where no costs of transport are involved.

Generally the trade between two countries, or of one country with the rest of the world, covers a range of commodities and the corresponding transactions to be aggregated have to be expressed in monetary terms.

Instead of being estimated as changes in the ratio in which quantities of the various commodities are exchanged against each other, adjustments of terms of trade are in practice estimated by means of the price changes for the various commodities. The terms of trade index will result from the combined effect of those price changes and will be equal to the ratio of the price index of total exports to the price index of total imports.

A number of methods exist for the computation of the price indexes, depending mainly on the system of weighting, as indicated below.

(b) *Basic statistical material*

Foreign trade statistics, which furnish the basic statistical material for the computation of terms of trade indexes are obtained from entries made by customs administrations. These statistics are fairly detailed and practically exhaustive.² They have, however, a number of imperfections. Quantities are as a rule fairly accurately known, but there are exceptions such as conventional unit weight per bunch of bananas and bag of coffee, which may not be the actual weight. Sometimes there is an understatement of weight, when this affects the duty. Declared values, on the other hand, may involve a considerable margin of error. As in most cases they serve as the basis for the calculation of customs duties on imports, it is in the interest of the person making the declaration to understate the value so as to avoid paying part of the duty. For exports, in a number of cases nominal values are used which may differ from transaction values. In some important cases there is no transaction implied because the exporter and the importer belong to the same firm, so that the value has to be estimated.

Quantities and declared values are shown in statistical publications in accordance with nomenclatures which may be more or less detailed. Even when they are highly detailed, different commodities or different qualities of one and the same commodity will be grouped under the same heading. Prices used for the computation of price indexes are derived from these data on quantities and values and will suffer from the inaccuracy of declared values and the heterogeneous nature of the headings in the classification. To distinguish them from actual prices used in each transaction, they are called unit values, i.e. the value per unit of quantity as derived from foreign trade statistics.

(c) *Index numbers of unit values*

Over a fixed period, aggregates of values for the various items of a nomenclature may be influenced by two

² Apart from contraband and some special types of transactions, all entries are recorded.

distinct factors: variations in the quantities and variations in the prices. To distinguish these two components of value index numbers, both indexes of quantity (or quantum indexes) and index numbers of unit values are computed. When computing unit value index numbers, the quantity effect is removed by assuming that quantities have remained unchanged between the current and the base period, and trade values for the two periods considered are measured with the same set of quantities. The ratio between these constant quantity values —generally multiplied by 100,— is called the unit value index. It can be assumed that the movements in the value index not explained by this index are due to quantity changes, which can thus be shown by an index number obtained by dividing the value index by the unit value index.

(i) *Weighting methods.* The various types of index numbers differ principally according to the method of weighting used. The most usual methods are the well-known systems of Laspeyres (with the quantities of the base period) and Paasche (with the quantities of the current period).

With a Laspeyres index it will be assumed that the quantities remain the same as those of the base period. Prices of the current period are applied to these quantities for obtaining the value of the base year trade at prices of the current year. The unit value index is obtained by relating this value to the value of trade in the base year.

With a Paasche index, the quantities of the current year serve as weights and their value at base year prices is computed. Then, values at current and base year prices corresponding to these quantities are related for obtaining the unit value index.³

The choice of type of weighting would depend on the purpose the index should serve: if it is desired to measure the change of terms of trade on the assumption that the structure of imports and exports is still the same as that of the base year, the unit value indexes should be of the Laspeyres type. If the change in terms of trade should take account not only of price movements but also of a change in the composition of imports and exports, a Paasche weighting should be used.

(ii) *The coverage of index numbers.* Quantities are not always specified for every commodity traded, and for a certain number of items they relate to goods of such a widely differing nature that they cannot reasonably be used for the calculation of unit values. As a result, the indexes rarely cover directly the whole trade, and it is necessary to make estimates for the products that are excluded.

(d) *Indexes of terms of trade for Latin American countries*

Most of the existing series of foreign trade indexes have been elaborated by ECLA and the few countries which compute their own indexes use a similar method, so it is sufficient to describe the procedure followed by ECLA for obtaining a general idea of the quality of foreign trade indexes (including terms of trade) for the various countries and also for Latin America as a whole.

(i) *Basic data.* In Latin America, declared values of trade suffer much from inaccuracy and lack of compara-

bility, especially when data have to be compared over a long period of time.

Import values are probably underestimated to an increasing extent because the reinforcement of customs barriers and other taxes on imports is an incentive for the importer to under-report the actual value of transactions. This bias has a lowering effect on the unit value of imports. In several countries, import values are given on a f.o.b. basis, although most imports are made on foreign ships, so that freight and insurance should normally be considered as part of the value of imports.

In the case of exports the quantity may be under-reported when royalties are paid by the exporter. There may also be underestimation in relation to the quality of goods (for instance, a lower quality is declared for coffee or a lower grade of metal content is reported for ores) and sometimes to the value, although most export taxes are on a quantity basis.

(ii) *Export unit value index.* Exports from Latin American countries have up to now been concentrated on a few primary products, which represent the bulk of total exports. The quality of these products does not change much with time, so that with a few homogenous items it is possible to compute a unit value index with a high coverage. For most countries, a sample of less than ten commodities is sufficient for covering more than 95 per cent of total export. In a few countries for which a greater number of products participate in exports, it is necessary to include more than 50 items (for instance 61 for Argentina).

Even when only a few commodities have to be considered, important shifts have occurred since the twenties which give a special importance to the type of weighting system used. For the kind of analysis in which ECLA is most interested, trade data are needed for each period both at current prices and at base year prices. In other words, trade data are used for their actual value and also for the value obtained by assuming that no price change has taken place since the base year. The result of dividing the actual (or current) value by the value of this trade measured at base year prices is an index of unit values (or prices) of the Paasche type (i.e. with current quantities as weights). It means that terms of trade indexes used by ECLA take account of changes in both prices and quantities in the composition of external trade.

(iii) *Import unit value indexes.* Special difficulties are met when unit value indexes are computed for imports of Latin American countries because of the very wide range of commodities which are imported from a large number of countries. Unit values for very elaborate manufactured products such as machinery or vehicles are, as a rule, subject to a wide margin of error because a given item of the trade nomenclature will include a number of different models of the same type of goods.⁴ For this reason, unit values of imports into Latin American countries are less reliable than their export unit values. It is currently said that a comparison of import unit values over a long period of time is subject to a down bias because the quality of manufactured goods improves with time, owing to technical progress. As a matter of fact, one ton of machinery will probably corres-

³ With a Laspeyres index the question is how much greater (or less) than in the base year is the value of the quantities of the base year and with a Paasche index the question is how much greater (or less) the value of the quantities of the current year.

⁴ It is considered in industrial countries that an export index of manufactures is difficult to compute because of the heterogeneity of goods. The problem is even more difficult to solve for imports of manufactures because the variety of suppliers represents an additional obstacle.

pond to a bigger investment in "real terms" in 1960 than in 1925. However, this observation may not hold true for all classes of manufactures and a more detailed analysis of this aspect will be made in the second section.

ECLA has computed series of foreign trade indexes for most of the countries of the region, starting from 1925, on the basis of 1937 = 100. Because of a number of improvements in trade statistics since 1937, it has been necessary to shift the base year to 1950 and subsequently to 1955 = 100.⁵ When it is desired to compare the terms of trade over the whole period 1925 to 1960, it is therefore necessary to link the three available series. In theory, this operation is not statistically correct, because Paasche's indexes are not reversible in respect of time. It means that a different index would be obtained by computing directly the data for 1925, instead of obtaining the index by linking the various series based on 1937, 1950 and 1955 successively. As an illustration of this, data in table 1 show first of all unit value indexes of imports and exports for 1955 based on 1950 = 100 and secondly, the same indexes originally based on 1955 = 100 and then converted by simple division to 1950 = 100. It can be seen from the data in this table that the shift in the base year from 1950 to 1955 affects export indexes to a varying

⁵ At its fourth session, the United Nations Statistical Commission recommended the adoption of a post-war base year and a change in base year from time to time (generally each five years).

Table 1

LATIN AMERICA: EFFECT OF CHANGE IN BASE YEAR ON EXPORT AND IMPORT UNIT VALUE INDEXES

Indexes for 1950 (1955 = 100)

	Exports			Imports		
	1950 base	1955 base	Dif- ference Percentage	1950 base	1955 base	Dif- ference Percentage
Argentina	99	96	-3	112	125	+12
Bolivia	116	110	-5	91	96	+5
Brazil	103	106	+3	102	119	+17
Chile	151	152	—	114	127	+11
Colombia	119	118	-1	102	119	+17
Ecuador	116	108	-7	101	...	...
Paraguay	146	145	-1	...	...	...
Peru	96	96	—	103	112	+9
Uruguay	85	93	+9	99	111	+12
Venezuela	112	112	—	109	116	+6
Sub-total	109	109	—	106	119	+12
Costa Rica	127	125	—	109	109	—
Cuba	91	90	-2	102	106	+4
Dominican Republic	100	100	—	109	125	+14
El Salvador	139	141	+1	109	110	+1
Guatemala	130	127	-2	104	116	+12
Haiti	117	116	-1	111	...	...
Honduras	136	125	-8	106	115	+8
Mexico	105	109	+4	112	120	+7
Nicaragua	134	139	+4	98	105	+7
Panama	114	112	-2	105	108	+3
Sub-total	104	104	—	107	112	+5
Total, Latin America	108	108	—	106	118	+11

SOURCES: Indexes computed on a 1950 base are taken from *Economic Bulletin for Latin America*, Vol. III, No. 2, while those originally based on 1955 are taken from the *Suplemento Estadístico*, *ibid.*, Vol. VI.

extent (ranging from - 7 to + 9) and no particular tendency can be observed. On the contrary, nearly all import indexes are affected by an up-bias. In other words, the more recent the base year, the higher the price increase.

2. TERMS OF TRADE OF CHILE

To illustrate the nature of the problem of computing terms of trade and the size of the margin of error involved, the present section gives an account of the main points in relation to Chile's external trade.

As explained in the first section, ECLA has computed three successive series with 1937, 1950 and 1955 as base; these are shown in table 2. There has been no fundamental change in the Chilean nomenclature since 1925, apart from the introduction of new articles, and it can be said that the classification of goods has remained the same over the period.

For exports, the computation of indexes has been made on the basis of the 55 most important items, which represent altogether more than 95 per cent of total exports. As far as the comparability of data over time is concerned, it can be said that the qualities have been fairly similar

Figure I

CHILE: UNIT VALUE INDEXES AND PARTICIPATION IN TOTAL EXPORTS FOR THE MAIN EXPORT ITEMS

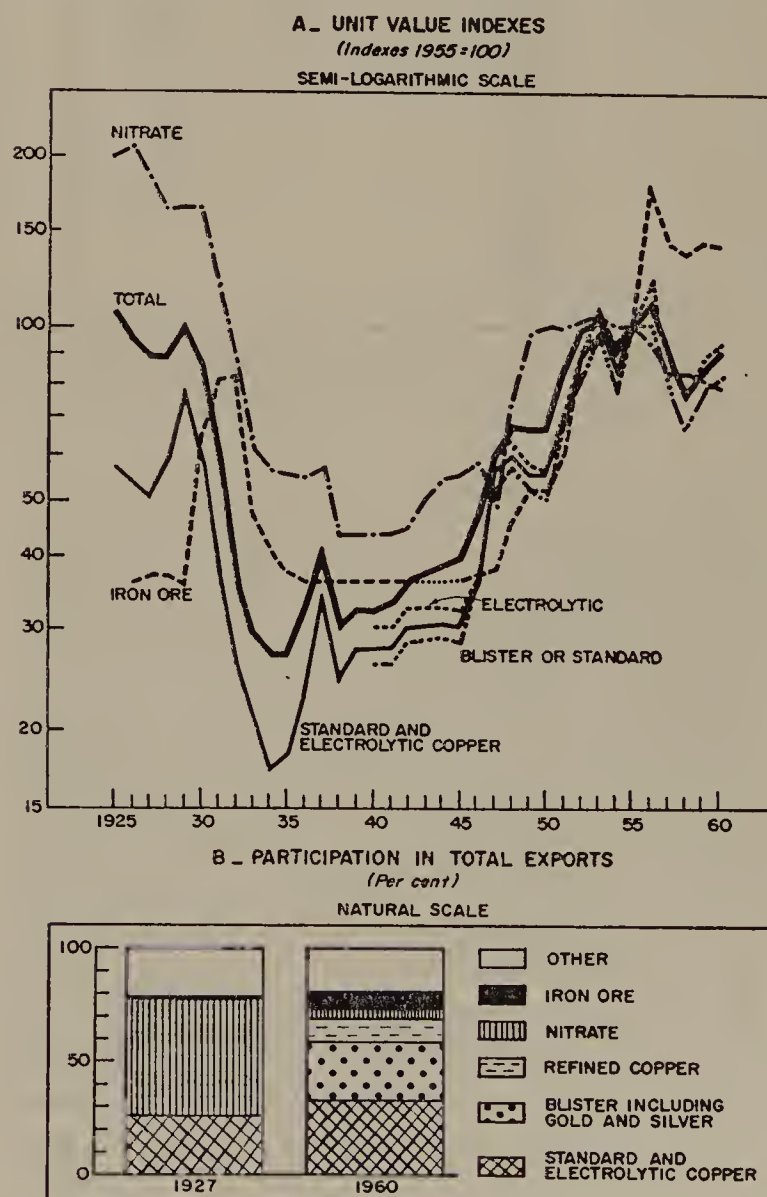


Table 2

CHILE: INDEXES OF EXPORT AND IMPORT UNIT VALUES AND OF TERMS OF TRADE

Year	Exports			Imports			Terms of trade (1955=100)
	Original base year		Linked Series ^a (1955=100)	Original base year		Linked Series ^a (1955=100)	
	1937	1950		1937	1950		
1925	265		106	170		56	189
1926	233		95	134		44	216
1927	223		89	160		53	168
1928	221		89	167		55	162
1929	249		100	179		59	169
1930	215		86	169		56	154
1931	145		58	160		53	109
1932	70		36	135		45	80
1933	73		29	106		35	83
1934	67		27	92		30	90
1935	67		27	87		29	93
1936	79		32	90		30	107
1937	100		40	100		33	121
1938	75		30	107		35	86
1939	81		32	96		32	100
1940	80		32	104		34	94
1941	82		33	112		37	89
1942	89		36	142		47	77
1943	91		37	164		54	67
1944	94		38	166		55	69
1945	98		39	173		57	68
1946	114		46	134		61	75
1947	147		59	223		74	80
1948	167	100	67	230	102	76	88
1949	169	100	66	237	100	73	90
1950		100	66		100	79	84
1951		126	84		115	91	92
1952		149	98		126	102	96
1953		148	102		118	97	105
1954		131	89		118	98	91
1955		151	100		114	100	100
1956		167	110		121	100	110
1957		133	87		120	98	89
1958			76			97	78
1959			84			101	83
1960			90			93	97

SOURCE: ECLA computations on the basis of Chilean trade data.

^a Indexes for the period 1925 to 1947 have been obtained by linking the series based on 1937=100 with the ones based on 1955=100 by using the overlapping indexes for 1948 as a link.

for the main commodities, i.e. copper and nitrate. For copper, however, the customs authorities had to introduce new items when a new type of copper was exported. During a long time "standard and electrolytic copper" were not separated. This however, does not seem to have introduced any significant error.⁶

In figure I, unit value indexes for the seven most important items are shown together with their participation in total exports in 1927 and 1960. The main features of Chilean exports during the last 35 years has been the tremendous reduction in the exports of nitrate and the growing importance of copper. The fall in nitrate exports has resulted from a collapse of external demand and has, of course, been accompanied by a tremendous fall in prices. This drastic change in the structure of Chilean exports, together with the wide dispersion of unit value indexes for each of the main items, gives special importance to the system of weighting which is adopted.

In 1927, nitrate represented 51 per cent and copper 26 per cent of Chile's exports, while in 1955 the participation

⁶ For iron ore, unit values are computed per ton of mineral and it is suspected that the metal content has fluctuated, but this product is still of only slight importance in Chilean exports.

of these products was 12 and 65 per cent respectively. Prices over the same period doubled for copper and were cut by half for nitrate. Under these conditions, a unit value index based on 1927 quantities indicates a rise of more than 40 per cent. Because it is obtained by linking three different series and also because of a larger coverage, the index used by ECLA shows an increase of 12 per cent.

For import unit values, the computation of an index is a very long process and the margin of error is considerable because there is a wide range of commodities and qualities. Quality changes over time are very difficult to appreciate and no adjustment can be made. Contrary to the case of primary products it is difficult to compare the changes in unit values of manufactured products with corresponding wholesale prices on the international market. Consequently, changes in import unit values should be regarded very critically. For Chile, the sample of commodities which are directly included in the computation of unit values covers more than 500 items. The main difficulties were met with in using items for which products are of a complex nature, such as passenger cars. For the corresponding items, quantities are given as

number of cars and are shown, together with values, for each make. However, it would not be easy to use this detail because all models are combined and the discontinuity of imports of some makes would create a serious problem.

Unit value indexes of imports classified into ten commodity groups are shown in figure II for the period 1948 to 1960. As can be observed, some price movements are quite misleading and cannot be easily explained.⁷

It is often said that the unit value indexes of imports of manufactures such as machinery and vehicles do not permit long-term comparisons because they do not take account of quality improvements due to technical progress in the producing countries. Since wholesale price indexes

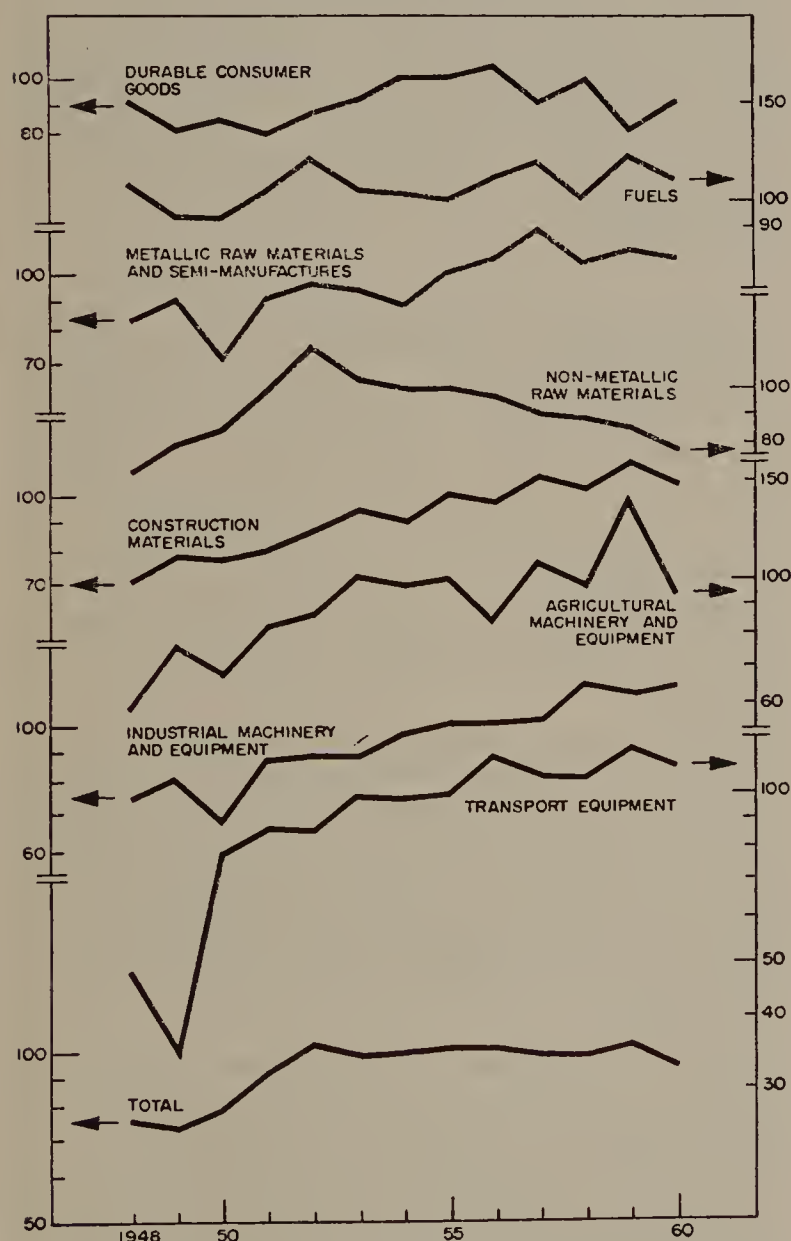
⁷ It is currently said in Chile that declared values of imports are more and more under-reported and, consequently, import unit values are affected by a down-bias.

Figure II

CHILE: UNIT VALUE INDEXES OF IMPORTS FOR THE MAIN COMMODITY GROUPS

(Indexes 1955 = 100)

SEMI-LOGARITHMIC SCALE



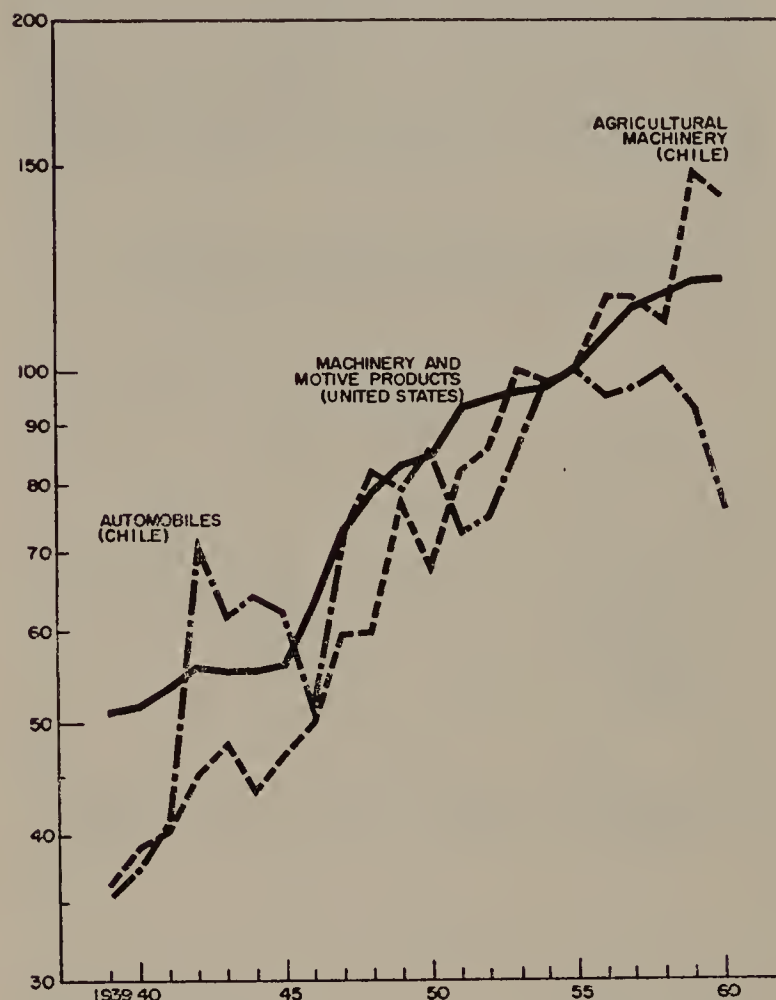
SOURCES AND METHODS: See *Economic Bulletin for Latin America*, Vol. III, No. 2, Explanatory notes.

Figure III

CHILE: UNIT VALUE INDEXES OF IMPORTS OF AUTOMOBILES AND AGRICULTURAL MACHINERY COMPARED WITH WHOLESALE PRICES IN THE UNITED STATES

(Indexes 1955 = 100)

SEMI-LOGARITHMIC SCALE



SOURCES: Automobiles: Unit value index based on average price per unit of cars.

Agricultural machinery: Unit value index based on average price per unit of weight.

Machinery and motive products: Wholesale price index taken from *Historical Statistics for the United States and Statistical Abstract of the United States*, 1962.

are constructed on a firmer basis,⁸ a comparison of both kinds of indexes is attempted in figure III. Many factors of incomparability exist between the two sets of data: first, wholesale prices are internal prices; secondly, their weighting does not conform to the structure of Chilean imports; thirdly, they do not include freight and insurance costs, and so on. In spite of these limitations, it can be seen that the unit value series for imports of passenger cars and agricultural machinery show a higher increase than wholesale prices, except for the period 1955 to 1960 for which values relating to passenger cars greatly decreased (so that the change over the whole period 1939-1960 is only 8 per cent higher than that for wholesale prices).

Finally, an attempt has been made to measure the effect of adopting a system of current weights instead of fixed

⁸ Wholesale prices are collected for very well defined specifications. When these specifications become obsolete, another series is constructed and the previous indexes are linked to those of the new series. In that way, the comparison eliminates the effect of change in quality.

weights. As a simplified computation,⁹ 24 series of unit value indexes by sub-groups (which are themselves current-weighted indexes) have been combined by using as weights the structure of imports in 1925. The resulting total index for 1960 is only 3 per cent lower than the index normally used by ECLA (which is weighted with current year quantities).

The accuracy of terms of trade data depends entirely upon the quality of unit value indexes. As a summary of the observations made in analysing data for Chile, the synoptic table presented below indicates the effect of the various factors on terms of trade indexes for the country.

CHILE: EFFECT OF SELECTED FACTORS ON UNIT VALUE INDEXES OF IMPORTS AND EXPORTS AND INDEXES OF TERMS OF TRADE

<i>Factor</i>	<i>Unit value index of exports</i>	<i>Unit value index of imports</i>	<i>Index of terms of trade</i>
(1) Differences in quality over time within elementary items	Unimportant	Some influence especially on engineering products	Slight down bias
(2) Choices of weighting	Strong influence	Minor effect	Strong influence
(3) Change in base year	Some influence but not systematic	Systematic up bias when the change is for a more recent year	Down effect due to imports

Chile: Index of terms of trade
(1955 = 100)

<i>Period</i>	<i>Index</i>
1925-30	151
1931-35	92
1936-39	103
1940-45	77
1946-50	84
1951-53	98
1954-56	100
1957-60	87

Because of the margin of error in import unit value indexes, many sudden changes from year to year in the terms of trade are inexplicable and should be attributed partly to statistical errors arising essentially from erroneous valuation of imports and lack of homogeneity within a number of items included in the computation. Data, however, have a more forceful meaning when

⁹ It has not been possible to compute a fixed-weighted index at the level of the 500 items, because of the enormous work it would imply.

averages over several years are computed and when observed changes are of considerable magnitude.

As can be seen from the data shown above, there is no doubt that the terms of trade of Chile have seriously deteriorated since 1925-1930. Even if allowance is made for a wide margin of error in the computation and even if the most favourable system of weighting is used, the fact remains that such deterioration has been quite considerable. On the other hand, if unit value indexes compared 1925-1930 directly with 1955, with quantities of the first period used as weights, the resulting terms of trade index would indicate a more serious deterioration.

The critical appraisal made here of statistical procedures and basic material used in measuring the terms of trade of Latin American countries should not lead the reader to think that such data are not sufficiently reliable to be used in quantitative analysis. As a matter of fact, the changes over time have been so considerable that conclusions can be drawn with a sufficient degree of certainty.

Finally, it should be pointed out that in spite of the existence of an infinity of weighting methods resulting in a wide range of measures, the procedure chosen by ECLA corresponds to a very precise connotation which is of interest for the kind of analysis in which terms of trade data are used. Basically it is assumed that a country should modify the structure of its exports to take the utmost advantage of world market conditions. On the other side, the import requirements of a country engaged in the industrialization process are of a changing nature, depending on the structural changes of its economy. All these conditions are taken into account in the procedure used by ECLA.

STATISTICAL ANNEX

In most cases the Latin American countries published their trade data in national currency units, which creates a problem when there is a multitude of exchange rates for the various classes of imports and exports. The unit value indexes should be expressed in the same currency and the values they are based on should exclude the effect of any manipulation of the exchange rate, which are no less than a tax or a subsidy. Therefore, if a multiple exchange rate system exists, all the values considered (down to those for each individual commodity) should be converted into another currency such as the U.S. dollar. This is in some cases a difficult and lengthy operation.

The export unit value indexes for each country are computed in the following way: in spite of the concentration of exports on a few important commodities, a number of items cannot be directly included in the computation. In the selection of the sample items, prices for the base year are multiplied by quantities for each year and each item of the sample is grouped into five sub-totals: Agricultural products (excluding livestock); Livestock; Fuels; Other mineral products; and Other products (including manufactures).

Values at current prices for the items of the sample included in each group are related to the corresponding values at constant prices, the ratio (multiplied by 100) being equal to the unit value index for the group.

An exhaustive distribution of export values according to the five groups mentioned above is made only for the base year, except for fuels which are entirely covered by the sample.

In adjusting for incomplete coverage of the sample, a double assumption is made: (i) the remaining part is distributed according to the pattern of the base year and (ii) price changes for the uncovered part of a given group have been the same as those for the covered part. In this way, unit value indexes are obtained for each group and for total exports.

Indexes of unit values computed according to this procedure are weighted by current quantities and are therefore of the Paasche type. Quantum indexes of the Laspeyres type are obtained by dividing the current value index by the corresponding unit value index.

The procedure used in computing the unit value index of imports for Latin American countries is essentially the same as that described above for export indexes. However, additional problems arise because of the very large range of products which are imported. Even when more than 500 items are included in the sample, many of them would have to be sub-divided into sub-items to ensure greater homogeneity as far as the qualities referred to are concerned. It is obvious that changes in composition within each item, due to changes in articles, in country of origin and so forth, cannot be eliminated.

ECLA has done its best and has obtained import indexes for nearly all the countries of the region. However, the enormous task of checking the meaning of price changes for each of the items of the sample is at present beyond its resources, and it is recommended that each country undertake to compute such indexes with adequate resources in staff and equipment.

Two main classifications of import values are used in ECLA, one into 10 groups¹⁰ by final use, and the other into 14 groups, which is a combination of breakdown by commodity and final use. These two breakdowns are obtained by regrouping 53 indexes, themselves obtained by summing the corresponding items. An exhaustive dis-

tribution of import values for each of these classifications has been made for the base years (1937, 1950 and 1955) only, because the cost of obtaining such data for each year is prohibitive. An adjustment is made for the remainder: for the series based on 1937 and 1950, it has been assumed to be proportionate to the values in each group, while for the 1955 series, it has been assumed that each nucleus takes the same share of "uncovered items" as in the base year.

Unit value indexes are computed at the level of each nucleus by dividing the current value corresponding to items included in the sample by the value at constant prices. In adjusting for incomplete coverage at the level of each nucleus, it was assumed that prices for the uncovered part have followed the same pattern as those of the covered part. Unit value indexes for each group of the two classifications, and for the total, were obtained by combining the 53 indexes by sub-group.

It is hoped that in the near future most of the countries of the region will publish their import trade data according to a common classification, because all members of the Latin American Free-Trade Area are committed to publish data in BTN terms, with conversion to the SITC revised. This will be an enormous improvement, because the classification will be a standard one, current values will be shown at various levels of regrouping and the individual items being more numerous, their content will be more homogeneous. When this material becomes available in ECLA, it is intended to make a rigorous critical review of the sample of items directly included in the computation. A greater number of elementary series will be considered in the computation, but the coverage of the sample will probably decrease owing to the elimination of all series for which unit value indexes are meaningless.

For future details on the methodology, and for the actual data, the readers are referred to the various issues of the *Statistical Supplement of the Economic Bulletin for Latin America*.

¹⁰ For further details see *Economic Bulletin for Latin America*, Vol. III, No. 2, Explanatory notes.

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